The Veterinary Record.

FOUNDED BY WILLIAM HUNTING, F.R.C.V.S., 1888.

NO. 1. JANUARY 3, 1931. VOL. 11.

Some Phases of Veterinary Inspection under the Milk and Dairies Acts and the Tuberculosis Order. Differential Diagnosis. The Application and Interpretation of the Double Intradermal Tuberculin Test.*

By Hugh Begg, F.R.C.V.S.,
COUNTY VETERINARY INSPECTOR FOR LANARKSHIRE,
HAMILTON.

If I were to offer any reason for accepting the honour of addressing you to-day, I must plead the impossibility of refusing your kind invitation, conveyed to me jointly by your genial Chairman and your veteran Secretary, to both of whom I am indebted for a long and steadfast friendship.

Considering the scope of the text given to me, I will deal with those phases of the veterinary inspector's duty that present practical difficulties, and perhaps it will emerge that these are by no means confined to the professional problems that on occasion baffle decision. Indeed, so varied are the interests, the susceptibilities and the temperaments of our stockowners, into the heart of whose jealously-guarded business of milk producing we are called to probe deeply, that the veterinary inspector must cultivate, if he does not inherently possess them, all the arts of courtesy, gentlemanliness and suavity, and withal a quality of uprightness and decision in judgment that is calculated to impress favourably any stockowner inclined to harbour a grievance against the work he is called on to perform. He must needs be the prototype of Father O'Flynn, with his wonderful way, "teaching the aisy ones, coaxing the crazy ones, lifting the lazy ones on wid your stick."

Those of us who are intensively engaged in work under the Milk and Dairies Act and the Tuberculosis Order day by day and are acting under both with untrammelled powers, are deeply impressed with their great potential capacity as complementary handmaidens, enabling the accomplishment of double duty by single visits of inspection. Our dairy herd inspections under the Act are definitely fruitful of cases amenable to the Tuberculosis Order.

Under a single yearly inspection of our herds in Lanarkshire, an average of 31·7 per cent. of our positive cases under the Order was so detected and without doubt this percentage will greatly increase when we institute, as we hope to do, from January 1st, 1931, the inspection of all herds three times a year. This tripling of inspection will necessarily increase the work to be done under the Tuberculosis Order, and, if the cases eventually decrease in number, as we hope they may, it will be competent to conclude that the work accomplished is in some degree eliminative of the disease, bringing nearer the day when our area will be ready for the institution of measures of eradication.

Similarly, when a case is reported under the Tuberculosis Order and the whole herd is available for inspection under the Act, the opportunity is again taken, even though the herd may have been inspected quite recently. The re-inspection of a herd at short intervals, enabling the occasional detection thereby of cases amenable to the Order which shortly before were unsuspected, forcibly illustrates the insidiously progressive character of the disease and exposes the almost explosive quality it can assume under stress of circumstances.

The routine veterinary inspection of herds is increasing steadily year by year, both in the North and in the South, but how are we to regard the remissness of so many local authorities to carry out their duty under both the Act and the Order, even after the lapse of five years? I understand that there are many counties where no suitable provision has yet been made for the routine inspection of herds under the Act or the operation of the Order. Is it not time that the powers that be should bring recalcitrant authorities to book and make them realise that in so far as they fail in their duty they virtually prejudice the value of the work of others? I understand that in some counties the veterinary inspectors, when asked to deal with any case reported under the Tuberculosis Order, are told to limit their inspection to the animal referred to in order to keep down the cost of veterinary inspection. As you know, this is entirely contrary to Article 4 (1) of the Order and one wonders why the Ministry tolerates such incompetency on the part of local authorities at this late date, when all of them have had sufficient time to put their house in order.

You will, perhaps, expect, or at least excuse, one who has been engaged in the inspection of dairy herds under the Public Health Acts since the morning twilight of County Veterinary Inspection dawned if he refers to what may seem to be the superfluous in the examination of dairy cows. The work is destructive of good clothing and, for those who can wear them becomingly, riding breeches with leggings, strong boots and three-quarter length oilskin coat in brown or black constitute the best rig-out. Some use white-, khaki-, or blue-coloured cotton coats, but they are expensive to maintain in clean condition and cannot be sponged down or disinfected like a smooth-surfaced oilskin coat. To preserve the buttons, one should always enter and return left side first between closely placed cows.

When entering a farm steading by motor, it is an advantage in saving time to sound the horn and manœuvre the car into position for quick departure. When a responsible attendant has appeared and you have exchanged greetings, the putting of certain leading questions provides you with important information, and it is our experience

* Paper presented to the Midland Counties Division, N.V.M.A., at Shrewsbury, on November 28th, 1930.

DEPT. OF VET. MEDICINE

that owners or persons in charge readily give such answers as they believe to be correct. *E.g.* :—Are the cows all well? Have you any case to report under the Tuberculosis Order (emaciation, chronic cough or indurated udder)? Have you been troubled with teat eruptions or " weeds "? Have you any other cows in milk or in calf? Have you sold any cows recently with defective udders? If cows are unclipped on udders, tails and flanks, and especially if some are soiled, one asks whether they have not yet made a practice of this and encourages them to make it a routine procedure, setting forth its sanitary advantages and explaining what should be done.

Recently, when discussing a paper on milk production by a professor from an agricultural college, I asked him how he thought the milk producer would regard a proposal to dock the tails of all female calves intended for dairying, but I got no reply. How would you regard it? I am personally of opinion that this should be tried out, and I need not depict the advantages that would attend tail docking from the point of view of clean milk production, etc. Its removal would doubtless be regarded by some as a wanton mutilation, depriving the cow of her defence against attack by flies, but we have seen cows do very well, summer and winter, without a tail, and lambs and horses are habitually docked for less weighty reasons than could be given for the docking of female calves. If thought necessary, hand spraying with a disinfectant solution could be done if flies were likely to be troublesome on hot days.

If we find the cows are out, we examine the premises while they are being brought in, noting defects in structure and sanitary conditions, etc., and especially examining the walls in front of the cows for the presence of sputum. This is very important. Sputum adherent to the wall in front of a cow almost invariably contains tubercle bacilli, and the responsible cow is almost inevitably amenable to the Tuberculosis Order, whatever bodily condition she may carry and however astonished the owner may be at your suggestion.

A flash light should be carried for use when there is defective light in the cowshed.

If the cows are housed when the visit is made, we immediately " sense " the quality of the atmosphere on entering the byre, making deductions regarding ventilation.

Should the visit be made at milking time, one can observe the methods adopted in preparing the cows for cleanly milking, the proper removal of milk, and note the condition of the clothing worn by milkers and whether they keep their hands clean. This is the time to check anything that is amiss and give advice or, if necessary, enforce amendment on the spot. If tactful suggestions in well defined cases of wanton carelessness meet with resentment, it should be plainly stated that the matter will have to be reported to the M.O.H., who will inevitably ask the owner to show reason why his milk supplies should not be stopped and will cause the local sanitary inspector to make repeated visits of inspection for a time to ensure that heed is being paid to instructions given.

Pursuant to manipulating udders, it is advisable to make first a general survey of the condition of the cows, taking a mental note of any animal referred to by the owner or detected by us as low in condition, or that repeats a cough, or shows enlargement of any quarter of the udder, or that has retained the fœtal membranes, or is suffering from profuse diarrhœa, etc. Keeping in view the complementary dual quality of our work and dealing, *e.g.*, with *a cow that is emaciated or obviously down in condition*, we ask the owner if he can account for her thinness, whether she coughs much, or occasionally, or has suffered from diarrhœa. Meanwhile, we auscultate the chest and, if ominous sounds are heard and the existence of cough has been admitted, a word of chastisement is in order in this, as in every case obviously amenable to the Tuberculosis Order, regarding the owner's failure to report the case. If satisfied that the case should be dealt with under the Order, the appropriate restriction notice is served, and we proceed to assess the *market value* of the cow mutually with the owner. I invariably make a note of my estimate, but do not readily disclose it until the owner has given his opinion, and, recognising that we have a duty to the owner as well as to the local authority, if my valuation is higher than his, my figure is adopted. But some owners are always " on the make " and "seek a street to fin' a hoose," telling the tale of what she cost one, two or three years ago. To be up-to-date as a valuer of stock, the veterinary inspector must take occasion at markets to observe the trend of prices, as decided by the auctioneer's mallet. It is not difficult to arrive at an appropriate market value for a milking cow, even with a keen owner. Get an admission of her potential value at last calving time and deduct the profit expected from such a cow during the months of lactation that have elapsed, giving due weight to any obvious loss of condition, existence of cough or abnormality of udder, etc., by way of subtraction. If the cow is again in calf and nearer to her next than her last parturition, one assesses value theoretically from the other end, the future instead of the past calving date, deducting for maintenance and, as in the other cases, for obvious defects. If the owner proves unreasonable, it is usually sufficient to warn him that a neutral valuator will be called in, whose value is almost sure to be less than your own. We have only required the services of a professional valuator once in five years. I daresay we will need a neutral valuator for the next one we remove from that herd.

The veterinary inspector's attention instinctively lingers about any cow even slightly lower in condition of body than her neighbours. Interest in her declines if an acceptable reason can be assigned for the loss of flesh or when, after examination, no evidence of tuberculosis can be determined.

When the extremely emaciated cow exhibits the characteristic signs of Johne's disease and entire absence of any suspicion of tuberculosis, apart from emaciation, the owner should be advised to have the cow slaughtered at his own risk. The case should, in my view, only be tested with tuberculin when one entertains a degree of suspicion that is not sufficiently convincing to enable decision without applying the test.

It is commonly held that the two diseases, tuberculosis and Johne's—each caused by acid-fast organisms—are antagonistic and do not readily exist concurrently. This is perhaps a false premise, drawing support from the fact that many cases of Johne's disease in young stock are almost, if not quite free from tuberculosis when examined after slaughter—a circumstance all the more impressive because of the view generally held until two decades ago that tuberculosis was the doyen of wasting diseases in

bovines and that persistent diarrhœa and wasting were as much the sign of tuberculosis as cough and abnormal respiration. Needless to say, the specific lesions of both diseases are quite frequently found in animals slaughtered under the Tuberculosis Order.

It is not uncommon for an adroit or feignedly ignorant owner to report under the Order a cow that is obviously approaching her end through some acute disorder of the uterus or udder, etc., hoping to get her dealt with and secure compensation—"something for nothing." When one decides not to handle such a case on the ground that her decline is due to some other disease than tuberculosis, the owner should be told that the objection to deal with the case under the Order is no guarantee on our part that the cow is non-tuberculous. If this is not definitely done, and sometimes whether or not, the owner is apt to harbour a grievance and talk of our incapacity if lesions of tuberculosis are disclosed when the cow dies or is slaughtered at his own risk.

In detecting and dealing with the cow suffering from *chronic cough and showing definite clinical evidence of tuberculosis,* one must keep listening in while on duty in the byre, noting the cow that coughs, for examination. It is amazing how many reputably experienced cattle owners are quite oblivious of the music in their byres or of the significance of repeated cough in cows that may or may not be faltering in well-doing. They really only hear discerningly when you tell them to listen to what you are hearing. An intensive study of coughing as we hear it in our dairy byres has a ripening effect on the efficiency of the inspector and perhaps some day there will arise a veterinarian, gifted alike in music and descriptive language, who will be able, by the use of a scale, to demonstrate the diagnostic value of all the sounds that come from the cow and correlate them to the physiological and pathological conditions that awaken them. If this is not done soon, its accomplishment will perhaps be forestalled by a "talkie."

Not every cow that has lung lesions easily recognisable on auscultation is suspect by reason of lost condition, and the detection and removal of such cases when they are milking well is an irksome job, though pregnant with good results, and no quality of case to be dealt with under the Order affords a better opportunity for the exercise of professional skill or the display of one's capacity to convince the owner against his will that the taking of the cow is in his own best interests.

The schema of the examination of the bovine chest for the detection of tuberculosis should be written up, but we have only time for a few random remarks to-day. Percussion is of little help, but with experience auscultation is a fairly safe sheet anchor and the veterinary inspector has such abundant opportunity under the Tuberculosis Order to check his conception in diagnosis by the stern facts revealed when the cow is killed that it would be surprising if he did not become something of an expert. In examining the chest, one subconsciously maps out its area for auscultation in keeping with what one knows of the anatomical appearance of a pair of lungs suspended horizontally. As the great mass of lung tissue is at the superior aspect of the organs, one expects and in practice finds that ominous sounds are chiefly heard with the ear applied to the superior nine inches of the chest wall. The sounds that determine decision are on occasion more apparent in the lower half, but not very often.

A single cough has seldom any significance, but its repetition when a cow rises or lies down or is disturbed by pinching the spine or reasonably pounding the chest wall, or when she is turned out, is fairly reliable *prima facie* evidence that some kind of lesion which the ear must try to detect has been irritated by the movement. In some cases the abnormal sounds are so marked that in the case of aged animals one decides for tuberculosis instantly. But the sibilant cooing and clicking râles produced by multiple old lesions of tuberculosis in the lung substance are quite indistinguishable from the sounds heard in cases of parasitic bronchitis occasionally met with in bovines up to four years of age. Such cases readily "snag" a novice and it is necessary to enquire regarding the history of the case and whether "hoose" is known to prevail on the farm where it was bred. If in any doubt, the tuberculin test should be applied with the signed consent of the owner.

Occasionally, when one has a cow under suspicion through the exhibition of a cough that is ominous in tone and character, we encounter the greatest difficulty in being able to hear sufficient evidence to condemn, as we desire to do, without the use of tuberculin. Decision is necessarily hesitating when the respirations are shallow and, because our patients cannot be made to say "ninety-nine" and we cannot at will cause them while tied up to inspire deeply or even to cough to disturb any existing lesions to assist our hearing, we are forced to adopt other tactics. Having estimated how much or how little can be heard with the animal breathing normally at rest or under such disturbance as can be applied to her in the stall, one keeps the ear applied over any suspected area for some length of time to experience the effect of the occasional deep inspiration that regularly follows the normal eructation of gas from the stomach every two minutes or so. If still undecided, turn the cow out and have her chased for some distance and brought in again or examine her on a halter outside. The increased respiration, with or without the occurrence of coughing, is of immediate help in many cases, but in some cases one has to continue auscultation during the slowing down of respiration and finds that the maximum of abnormal sound is to be heard when the number of respirations is about normal, though for a time essentially deeper in character than before she was turned out.

Post-mortem examinations provide many surprising revelations and lay bare many foolish notions. Consider, for example, the chronic cough case of tuberculosis in which the lesions are so often heavily developed on all the serous membranes, with little, if any, semblance of a lesion in the lung substance, although the lungs may be almost completely adherent to the chest wall. The vesicular sounds are normal all over and perhaps the only abnormal sound that can be heard to help diagnosis is a rhythmical click heard either at rest or when the cow is disturbed, from some part of the chest where, adhesion being incomplete, some movement occurs during respiration. In some such cases the tuberculous deposit on the chest wall may be so deep and heavy that the organs have to be cut out and one entertains the idea in diagnosis of probing the chest wall with a trocar and cannula, when a like case is suspected in future, in the hope that after the intercostal

muscles are pierced and the trocar withdrawn, a deeper penetration of the cannula may enable the withdrawal in its lumen of some of the cheesy material. In other cases involving the serous membranes, the adhesion is not associated with heavy deposit, but we find instead a general tuberculous adhesive pleurisy, when the lungs can easily be torn from the chest wall. Such evidence of tuberculosis in the chest is commonly accompanied by the like affection of the peritoneum with some degree of ascites. If there be undue rotundity of the abdomen in the live animal, suggestive of dropsy, an exploratory puncture may be considered advisable.

Animals that " roar " or " snore " from throat trouble, enlarged glands, tumours or abscess formation are the subjects of chronic cough and in respect of such animals there must be diverse views regarding their amenability to the Order. The conduction of sound in such cases is too pronounced for auscultation of the chest to be of any service. Moreover, in many cases that are tuberculous, the lesions are almost confined to the affected glands. In my opinion, the wanton application of the tuberculin test in all such cases is not warranted and as the throat lesion may be non-tuberculous one is not safe in taking them without the test in the absence of other clinical evidence of tuberculous invasion. We usually restrict and test only the grossest cases whose " *tid*," if the animals be left, offers little future return to the owner. Again, it is remarkable, almost beyond belief, how frequently the subject of sheer chronic tympany is the victim of tuberculous enlargement of the bronchial and mediastinal lymphatic glands.

The sudden onset of generalised tuberculosis involving a miliary condition of the lungs is, in the majority of cases, met with in recently calved cows that may have been carrying a fair market value. On that account they are usually dealt with as chronic cough cases for valuation purposes, as they have often preserved the appearance of health surprisingly well right to the end of gestation. Further, the *post-mortem* finding is predestined to be " advanced," when only one-fourth of the market value is payable by way of compensation.

The opinion is commonly held that heavy milking is the chief cause of the decline of the tuberculous cow, but I submit that the bearing of young is her *bête noir*. The calving period is a peculiarly trying time for the cow that is harbouring unsuspected, though perhaps marked, lesions of the disease. Like a tuberculous woman, she may brave her earlier pregnancies with seeming impunity, but the strain soon tells on many types of lesions. The trials of labour and the abrupt change in the relationship of organs to each other and to the parieties following the sudden emptying of the womb at parturition, combined with nervous exhaustion, must operate to cause stretching and tearing with renewed activation of existing pathological lesions developed in the earlier days and readily supported during pregnancy, with the result that active bacilli are erupted into the lymph spaces, etc., and their characteristic diffusion throughout the system is set in train. If these opinions have any appeal to you, perhaps we can agree that the calf-bearing tuberculous cow has little chance of experiencing the permanent healing of her lesions compared with the tuberculous male animal. The early evidence of this sowing out of bacilli is rather characteristic, for the picture of miliary tuberculosis of the lungs is not difficult to recognise, despite the fact that little more than an exaggerated vesicular murmur can be heard on auscultation. The cow is profoundly ill and depressed; cough, if heard at all, is short and painful, breathing is uniformly rapid and abdominal and the animal is immobilised, standing for long periods because she experiences even greater distress when recumbent. The temperature is variable and occasionally runs very high. If the evidence from auscultation suggests patchy dullness here and there in the lungs one must consider the possibility of the existence of non-tuberculous lobar pneumonia, a type of case that we have experienced occasionally in the last few years. If undecided, the intradermal and ophthalmic or perhaps, better still, the intrapalpebral test should be applied, but in acute miliary tuberculosis one does not expect a full-blown reaction but only a small one, more or less definite in character.

Cases of well developed emphysema of the lungs in bovines unaccompanied by other lesions are exceedingly rare. They exhibit chronic cough and the wheezy bronchitic sounds heard on auscultation are so similar to those of certain cases of diffuse pulmonary tuberculosis that a precipitate and false finding may be arrived at. My records show one such case in which, because it was a cow of small value and situated 20 miles away, I risked a diagnosis of tuberculosis, especially as the glands of the throat were larger than normal, and found no sign of tuberculosis on *post-mortem*, but only a pair of enormous emphysematous lungs that might easily have served to float a man. Any clinical suspicion of emphysema of the lungs in a case of chronic cough provides a sufficient and legitimate excuse for the application of the tuberculin test.

Having reviewed all cases suspected under the first two headings, we proceed to examine all the udders for the presence of cases of *tuberculosis of the udder*, as well as other conditions in need of attention under the Milk and Dairies Act.

I always begin to examine udders from the top left side of the byre and proceed round. My method has always been to stand behind the cow left side on and pass the palm of the left hand from behind forwards over the whole of the udder, beginning with the front quarters and palpating the udder tissue with upward pressure and taking note of the condition of the skin, especially on the teats. Under this procedure the great majority of indurations or cases of atrophy, etc., are easily detected. If there is any semblance of deep-seated induration in a hind quarter I grasp the suspected quarter with the left hand in front and the right hand behind the thigh and use palpation pressure, running the tissue through the right hand and making comparison with the neighbouring quarter. No degree or quality of induration is allowed to escape sampling if some product is available. We make use of four- and six-ounce wide-mouthed sterile bottles with cork stoppers, and each day put a consecutive number or letter on the cork with indelible pencil. When two or more inspectors are sending in milk samples every day, distinctive markings must be planned, so that there may be no confusion at the office when they are being finally labelled for the laboratory.

If two quarters are suspected, the bottle may be filled from both. In taking samples it is necessary to have clean hands and, having washed or wiped the teat with a

wet cloth, the sample is drawn direct into the bottle and the cork replaced at once and marked. Despite what I have heard of the experiences of others to the contrary, I have yet to meet the case which did not prove to be one of udder tuberculosis in which the sample taken from a suspected quarter direct into a sterile bottle with all necessary precautions was shown to contain acid-alcohol-fast bacilli under the microscope. We therefore continue to give immediate effect to all positive microscopic findings, and we have never known the biological result to belie us. On the other hand, all acid-fast bacilli found in the mixed samples of market milk are not tubercle bacilli, and in such cases one must rely only on guinea-pig inoculation. The product of a single cow with udder tuberculosis will infect a great bulk of milk when added to it and this explains the frequent infection of creamery milk as proved by laboratory experiments.

To secure maximum detection of cases of tuberculosis of the udder, it is necessary to take samples from every case of painless induration, definite or indefinite, and especially if hypertrophic in character, and a restriction notice under Articles 10 and 11 of the Order should be served and the animal should be valued to save further visiting if the case proves positive microscopically or biologically. Sometimes it has been deemed expedient to modify the original valuation if a period of four weeks has elapsed.

On occasion we have sampled a case of so little suspicion that it was not thought necessary to put on restrictions, only to find that the inoculated guinea-pig proved tuberculous after three weeks, when an immediate final visit was necessary to deal with the case. Experiences of this kind sharpen the wits and enable the development of highly specialised skill in the inspector. The mental difficulty in such cases centres around the propriety of restricting a case in which the odds are greatly in favour of negative result, when the owner may complain of his loss, and the danger to the consumer when the case proves positive, if no ban is put on the animal's produce.

A negative microscopic result of the sample taken in any case of really suspicious induration is a call for the taking of future samples for microscopic examination, so that the suspected cow may be caught at an earlier date than the maturing of the biological test.

We regard the following as *the chief clinical features of tuberculosis of the udder* :—The lesion is usually found in a hind quarter, often situated postero-superiorly, sometimes lower, at the base of the teat, giving depth to the quarter, or extending over the base of the teat. Lesions of the fore quarters are less common, about ten per cent. of the whole. The size of the lesion varies with its age, rapidity of growth being dependent on various factors. Whatever its size, the lesion is usually a single one with well defined, though often irregular borders, having the consistency of a piece of vulcanised rubber anchored in the udder tissue. Multiple nodules are not at all characteristic of udder tuberculosis, though a few such modified cases prove positive. The lesion is painless, is unattached to the skin, and there is no history of a febrile attack associated with its development. Tuberculous induration of the udder is almost invariably hypertrophic in character and in advanced cases may involve the entire quarter without extension to the other quarters. Usually only one quarter is involved—occasionally two are affected, but if we find all four quarters undergoing tuberculous induration simultaneously a hæmatogenous infection is indicated, presaging the existence of generalised tuberculosis and an early demise. Tuberculosis of the udder is seldom associated with other gross infections of the udder tissue. *The product* of the tuberculous quarter appears normal in the early stages—a most unfortunate circumstance affording the owner some excuse for sending it to market. When centrifuged it yields a greater deposit than normal milk. Later it changes to a greyish colour, yielding in some cases a marked deposit after standing. In older cases the product assumes an amber-yellowish colour, derived from the yellow-coloured lesions in the quarter. Occasionally an induration due to diphtheroid bacilli yields a greenish amber-coloured secretion, but its odour is offensive. Sometimes we meet with a case of complete induration of a quarter caused by diphtheroid bacilli as painless as one of tuberculosis and highly suspicious, though essentially harder and more nodular on its surface, which yields a flame-coloured product without odour and closely simulating the amber-coloured product of advanced tuberculosis of the udder.

It is the usual experience when one detects a case of induration of a quarter truly suggestive of tuberculosis, though not greatly advanced, and makes enquiry regarding it, that the owner states in confident style that the quarter has never been sore or the cow sick, and although he admits that the hardness or bulk in the quarter does not yield to milking, he assures the inspector in his most convincing manner that the milk has never been bad but has always been and is even now perfectly normal, in his opinion. In other words, the owner unconsciously supplies the proof that your suspicions are well based.

City authorities occasionally report to us that tubercle bacilli have been proved in the bulk milk of a herd in the county. This is a call for the immediate inspection of the herd, and on occasion the city Veterinary Inspector meets us at the farm. In many instances a case of tuberculous induration of the udder is detected, which explains the finding, but a special sample should be taken from every quarter that is in the least degree suspicious. If one or more clinically suspicious udders are found it is scarcely necessary for the County Veterinary Inspector to sample all the herd. If no such case is found one divides the herd into groups of four cows and fills a six-ounce bottle direct from their sixteen teats, a little from each, after discarding the first two streams. The bottles filled are duly numbered and a note taken of the cows in each group. In some special cases we take a sample from every cow-in-milk for microscopical examination and let the bacteriologist group the samples for guinea-pig inoculation. If one or more of the group samples is reported positive, a second visit is made, when evidence of a lesion may then be found if four weeks or more have elapsed. If none is found a sample is taken from each cow in the group for further experiment and one may attempt elimination of non-reactors by using the tuberculin test.

I understand that at the request of the Department of Health for Scotland, our four largest cities in Scotland are now undertaking a rather large campaign in the laboratory examination of numerous weekly samples from the bulk milk consigned to them from county districts.

Inasmuch as it is very rare to find tuberculosis of the

udder in association with other acute or subacute infections of the gland that occasion pain or immediate physical change in the product, one is entitled when at work in the field to regard such cases as essentially non-tuberculous. That opinion is based partly on clinical experience but chiefly on the results of much laboratory testing over several years of samples of product taken by us from every kind of abnormal quarter under instructions from the County Medical Officer. The clinical features in the abnormal quarter that deny tuberculosis are pain or even tenderness, heat, speedy induration unconfined within and involving the whole quarter, a round smooth contour with the integument fixed or almost fixed and sudden change in the secretion. The old-standing and often painless induration that is the relict of a streptococcal or staphylococcal mastitis that has exhausted itself is usually associated with atrophy or evidence of present or past occurrence of abscess formation, and those cases of multiple discrete small nodules lying in the tissue of a quarter yielding normal looking milk are usually found to be streptococcal in origin.

One requires to have great opportunity to compare unending clinical features with laboratory results before one can attain to anything approaching perfection in the mental sorting out of udder indurations. To the novice simpler conditions prove more baffling than acknowledged induration. Seen at milking time, a healthy hind quarter turgid with milk is readily regarded as indurated and fit for sampling if the other quarter be a little atrophied from having been the seat at some time of a mild mastitis. The apparent induration and the cocksureness of the novice yield at once to the removal of some milk from the quarter. Again, while no experienced veterinary surgeon would mistake any œdematous condition of the udder for induration, the œdema or " swaum " of the calving period presents such variety in appearance that the novice requires considerable opportunity before he can distinguish between the physiological and the pathological, and until he is able to appraise these states guinea-pigs may be sacrificed unnecessarily. Moreover, it is not possible to make a proper inspection of a markedly œdematous udder and the best possible can only be achieved after the udder has been emptied. It is such cases especially that compel the need for considering *"At what period of the day the veterinary inspection of dairy herds can be most efficiently accomplished."* It must be admitted that this can best be done during the first eight hours or so after milking and that the first few hours afford the ideal opportunity for the proper palpation of the udder tissue. If one attempts inspection of udders replete with milk it is not possible to attain perfection nor is it always practicable to request a sufficient unloading of every cow. This disability attaches to all inspections of cows attempted at milking time, and it is only then that the cows are available during the grazing period. To ensure reliable inspection one has to wait until the heavy producers at least have been milked and as this is destructive of time and puts a limit to the number of herds one can attend to within the period that herds are housed for milking, the question of economy in veterinary inspection creeps in. Indeed, the propriety of any extensive attempt to examine cows' udders during the summer, in Scotland at least, is very doubtful. In practice we endeavour to put off for summer inspection only a certain number of herds that are near at hand and where milking time is known to us. It is my considered opinion that only unexpected visits carry one hundred per cent. of value, and we never descend to the notification of stockowners regarding the day or hour of our intended visit. Even now, when we hope to inspect all our herds three times in the 12 months, our intention is to leave no more than a fraction of the third inspection for the summer months and to confine that to herds near at hand. Remote herds that have not been seen for the third time between January and May will be inspected when they are housed in the two last months of the year.

I have indicated that for some years we have taken samples of the product of all abnormal quarters detected by us which yield any secretion of whatever kind for laboratory examination, pursuant to the taking of disciplinary action in regard to the responsible cows by the County Medical Officer under Section 13 (1) of the Milk and Dairies (Scotland) Act, 1914. This work, done at the request of the County Medical Officer, has the effect of banning all the milk of the indicted cow so long as she has a quarter whose product, much or little, can be shown to contain micro-organisms and until its microscopical examination has proved negative. This problem of the weeded cow would be a choice subject for discussion by medical and veterinary practitioners. I believe that most of us would agree that the subject of mastitis should be certified under the Act so long as she is feverish and sick and the morbid process active, or the local conditions such as render contamination of the milk of the other quarters highly probable. Contention only creeps in when these features have departed, and my considered opinion is that the interpretation of that section of the Act ought to be standardised, so far as this is possible, in regard to cases of mastitis in their various stages.

All animals condemned by us under the Tuberculosis Order are sent direct to one or other of the Public Abattoirs belonging to the local authority. In only one case in five years did we send the animal to the knackers. That happened on a New Year's Day, when all the abattoirs were closed. All flesh passed by the Meat Inspector is sold by yearly contract to one individual, who sends for it and pays at the rate of 4¼d. per lb. Condemned flesh is lifted by the knacker and paid for at 3s. per cwt. Hides are consigned to the hide market and the proceeds remitted direct to us.

Inasmuch as there are points of distinction between the definition of " advanced " tuberculosis under the Order and " generalised " tuberculosis under the Public Health Acts that might be reconciled, there seems to be room for *rapprochement* between the responsible Departments of State. Some of our " not advanced " cases will always fall to be totally condemned by the Meat Inspector for serious non-tuberculous conditions, but it must be an awkward matter for the veterinary inspector under the Order who also acts as meat inspector when he meets the case that can only be regarded as " advanced " under the Order and as meat inspector he can see his way to pass a part of the carcass. As my Department has nothing to do with the inspection of meat, we keep in close touch with the meat inspector in all border-line cases and arrange our decisions by joint agreement, always recognising the

need, on occasion, for such divergence as seems inexplicable to certain owners of animals slaughtered.

. . . . .

The Application and Interpretation of the Double Intradermal Tuberculin Test.

I believe it is likely that you are more intrigued about this section of my text than any other, and although I have to interpret almost 3,000 tests every year, I am not confident that I can add anything that is important to what you know or can find in the report of the Tuberculin Committee and the excellent articles that appeared in the *Veterinary Record* of September 15th last, by Messrs. Glover and Downham and by Dr. Mohler, of America. My experiences and theirs are in almost complete agreement.

Our difficulty and consequently our interest centre almost entirely around the question of the "doubtful reactor," for in 95 per cent. of reactors and non-reactors alike one can come to a bold decision by sight alone, and that even at a distance, whether the test be applied on the skin of the neck or the caudal fold. Hesitancy in decision is inevitably begotten of inexperience and the certain tendency and effect of experience is towards regarding erstwhile doubtful reactors as positive through their presentation of features that mark some little distinction from the honest negative reaction.

The Negative Reaction.

If one carries a clear conception of the characteristics of negative reaction, the recognition of the other presents less difficulty. The reaction is negative when, at any time up to the 72nd hour, you can with difficulty find the seat of the double injection or when the local swelling is pea-like or not larger than an inverted trouser button. To a swelling as large as a half-penny one pays a little more attention, for in this case a measuring instrument records an increase of about seven millimetres. Despite this, the reaction is still negative and not even doubtful if it be quite circular, firm, insusceptible of moulding, discrete, with well-defined abrupt borders and without heat or tenderness. Swellings markedly larger are all positive, but they always embody other essential features.

The great majority of repeatedly tested non-reactors show no more than a pea-like swelling, but a few regularly exhibit a flattish circular button-shaped swelling that tends to decline towards the 72nd hour. Doubt, if it exists, can be dispelled by repeating the test and simultaneously inoculating with concentrated glycerine broth, using a separate syringe, and making comparison. If there be an appreciable difference in favour of the seat of the tuberculin test the case is positive.

We have noted that when an animal reacts fully for the first time the sites of some of the former negative reactions show up appreciably as if some activation had occurred. On occasion in non-reactors the old seats of inoculation reappear for some reason during the test. Often when my assistant goes to inject the second dose at the 48th hour he finds two pea-like swellings in the clipped patch where none was evident at the beginning of the test, and the recently-set-up one can only be distinguished by a slight evidence of hair matting.

It has been our experience that no case is so likely to yield a small reaction by measurement as the acute, advancing case of miliary tuberculosis, but the swelling, though small and perhaps exhibiting no easily recognised heat or tenderness never lacks the tell-tale character of gravitating diffuseness.

The Positive Reaction.

When this is full fledged it admits of no doubt. A close study of its characteristics readily enables their detection, even when ill-expressed, in small-sized reactions.

These are:—A sufficient degree of swelling, not less than seven millimetres increase, which is diffuse, velvety, and gravitating, showing greater length perpendicularly than breadth, and usually exhibiting some degree of heat or tenderness. In other words, the exudate filters downwards in some degree, showing departure from the hard circularity of negativeness and simulating in some cases a commencing local lymphangitis. Moreover, all these features are well maintained to the 72nd hour or beyond it, when on occasion they are even better set out. We have met with reactions that retained positive character up to the 12th day, and it is our experience that over 90 per cent. of reactions are quite decided at the 24th hour.

Application of the Test.

The use of an efficient dental syringe fitted with a needle of appropriate length renders the delivery of the dose of tuberculin a facile matter, and the knowledge that one can hardly fail when so equipped begets confidence in the results obtained.

I have no use for disinfectants on the skin prior to the test, and but little for skin measurement before or after it, though I can understand its need when results have to be submitted in detail to individuals who can only appraise them when set out in figures along with descriptions of character in a certificate. Nevertheless, the most experienced amongst us must admit that when in doubt the tribunal of finger palpation of the reaction is the final means of decision.

Shaving or clipping of the site of the test is generally recommended and adopted, and I have no objection to such procedure, which carries certain advantages, but I am convinced that the test can be carried out unprejudiced and with equal results without any removal of hair, unless in very exceptional cases. Again, by the occasional production of a weal in the process of shaving or clipping, the interpretation of the results has sometimes become involved.

May I be allowed to declare anew, as a matter of first-rate importance, that the direct introduction into a tubercle-free herd of a non-reactor that has been exposed to infection is extremely dangerous? Incontrovertible experience has taught us that the development of the capacity to react to tuberculin is in many cases very long delayed. A fuller realisation of this regrettable and immensurable factor should operate to remove or lighten the heart-burning that so many of the most careful members of our profession have experienced on hearing that animals that failed to react in their hands have subsequently reacted when tested for the buyer by other veterinary surgeons. Moreover, to understand this period of incubation serves to remove much of the stigma hitherto attached to the exportation of pedigreed stock passed in this country and rejected abroad. If I had time to explain some of our cases on record, you would see that a period of two years is suggested as not being beyond the limit. This need not occasion surprise. Should the initial infection consist of a single dose of a few bacilli I regard it as certain that the development of

the capacity to react to tuberculin will take more time than in the case of an animal continually exposed to infection and receiving each day multiple doses of infective bacilli. One can only regard the failure of tuberculin to detect the infected animal while in this stage of "tuberculous parasitism," and until it has become allergic, as a far-reaching weakness. Its disability here explains, as I have said, multitudes of untoward results and doubtless was the factor that prejudiced the success of Bang's method of prophylaxis.

Inasmuch as the bacilli that invade the virgin animal under natural conditions are potent, and in virtue of their protective shell do not succumb to phagocytic digestion, the stage of parasitism eventually gives place to the establishment of tuberculous lesions. Incidentally, it is obvious that the whole concept of B.C.G. vaccination is to provide artificially a first invader that is innocuous and only capable of producing tubercles but not tuberculosis.

Again, when the capacity to react is fully developed in a hitherto non-reactor, the reaction is often more full-blown than we get in an old-standing clinical case of tuberculosis, and it is to be regretted that the degree of reaction is no measure of the prevalence of lesions in the tested animal.

Moreover, as I have said elsewhere, it is inconceivable that the distinct non-reactor of to-day can become a definite reactor to-morrow and there must be a period of latency, perhaps very variable, between the negative and positive phases of reaction to tuberculin in the incubating animal when the saturation of the humours of the infected subject with the lysin of tuberculous endotoxin provides incomplete allergy and is only sufficient to yield in the reaction a very slight emergence from the negative picture towards positive character in respect of size, shape, sensitiveness and diffuseness. This stage naturally compels doubt in the mind of the inexperienced, but one soon learns through later re-testing of such cases to classify as positive any real departure from negative character.

It is worthy of comment that when a *post-mortem* examination is made of an animal that, having passed one or more tests successfully, eventually yields a positive reaction, no naked-eye evidence of disease is likely to be found, and so it is evident that the capacity to react is well developed before the creation of recognisable lesions. In other words, a sufficient saturation with the lysin that enables reaction to tuberculin can be evolved from foci invisible to the naked eye.

On that account, owners of ordinary infected herds who depend on public markets for calving cows would be well advised to buy the good quality recent reactor discarded from a graded herd in preference to the untested market cows of which the majority are likely to have the disease in a more advanced stage.

If time had permitted I could have provided you with some very interesting experiences which we have had in the use of tuberculin, especially one case exhibiting the capacity of the disease to spread rapidly under one roof in a graded herd. This case created a great furore in departmental veterinary and agricultural dovecots at home and abroad, and caused us a lot of quite unnecessary trouble, but no expression of regret or apology has ever come through from the owner of the herd or those veterinary advisers who incited or encouraged him in his ill-fated campaign against us. It would have afforded me no small satisfaction to lay bare the features of this experience to a jury of veterinary surgeons.

. . . . .

I have tried to portray my conception of some of the thorny problems that beset the daily round and test the skill of the Veterinary Inspector of a Local Authority.

The inexactitude of veterinary science in this domain, as in that of the private practitioner, especially in differential diagnosis, is a matter that will only bear reduction at the hands of a deeper study that can reveal items of truth acceptable to all.

Meantime, it is often a case of many men, many minds, recalling the verse from Browning's "Rabbi Ben Ezra":—

> "Now, who shall arbitrate?
> Ten men love what I hate,
> Shun what I honour,
> Slight what I receive,
> Ten, who with ears and eyes
> Match me; we all surmise,
> They this thing, I in that,
> Whom shall my soul believe?"

Nevertheless, whatever our limitations, I think we can claim that we are conscientiously endeavouring to read clearly our allotted portion of Nature's infinite book of secrecy.

. . . . .

Discussion.

The President (Mr. H. Tudor Hughes) opened the discussion. He said: In the first place, I should like to tender my thanks and express my appreciation of his great kindness to Mr. Hugh Begg for sparing us of his valuable time and coming all the way from Scotland to address us.

Personally, I feel very much indebted to him for so readily agreeing to give us a paper on such a wide text, in all details of which we recognise him to be a past-master, and one of the first in the Kingdom to devote his whole time to his duties of Veterinary Inspector under a County Council (Lanarkshire).

Mr. Begg has referred to the complementary manner in which the Milk and Dairies Act may work in conjunction with the Tuberculosis Order, to bring to light cases in earlier stages of the disease than is the case in an area where the Tuberculosis Order only is enforced, which results in a much greater measure of protection being afforded to the milk consumers in general, and the children in particular.

The foundation stone of a safe and pure milk supply is a sound and healthy cow, and to achieve this end some of the more progressive authorities have decided upon more frequent inspection of the cows themselves, rather than rely upon the data obtainable from examination of the milk, or surroundings, *e.g.*, buildings, water supply, etc.

The examination of the milk may disclose the suspected herd, in the case of biological guinea-pig testing, after an interval of about a month, whereas examination of the herd will the more readily eliminate the dangerous cow.

In this connection, one may well raise the point of view of the owner of the cow detected with a suspicious udder who is put under restrictions for a period up to six weeks and not allowed to use the milk without sterilising it. Could not this period of delay be shortened, to the mutual benefit of all concerned, by confirming one's suspicion on clinical examination by a positive reaction to the tuberculin test?

Here one may consider the cases where the tuberculin test may be appropriately applied under the Tuberculosis Order for the purpose of differential diagnosis :—

1. From " husk " in young animals.
2. From Johne's disease in older animals with suspicious chest sounds.
3. From emphysema, which can give rise to a pulmonary jazz band.
4. In roarers or snorers, where auscultation is unsatisfactory and there may be no evidence in the udder or glands.

Our thanks are due to the author for the clear way in which he throws light upon the reason for many a tuberculous cow wasting away with astonishing rapidity after calving, showing that it is due to that process rather than to milking.

Mr. Begg's remarks with regard to the importance of acid-alcohol-fast bacilli in *direct* samples of milk from a suspected udder, as contrasted with the finding of similar bacilli in loose milk, are worthy of attention.

In the case of the " weeded " cow, *i.e.*, one affected with mastitis, should her produce from the other three quarters be condemned for the rest of the period of lactation? If so, then there is a prospect of serious loss to milk producers with no corresponding gain to the consumers.

Few counties enjoy the same facilities as Lanark for sending Tuberculosis Order cases to abattoirs, and failing such facilities one has to dispose of animals to the knackers with a minimum salvage value.

Mr. H. T. Matthews said that Mr. Begg was always worth listening to, whether right or wrong. The essayist was not a man who needed praise and therefore there was little point in mentioning the matters on which he was so clearly right. He proposed to refer only to some parts of the paper with which he disagreed. Mr. Begg said, for instance, that the presence of sputum in front of a cow invariably indicated tubercle in the lungs. As one who had examined many samples of sputum, he (Mr. Matthews) ventured to differ. " I find a number of cows, newly calved, passing through a market, probably having a long train journey, who cough a lot of sputum for some weeks, but repeated examinations of the sputum prove negative and the cows do well. I agree, however, that examination of the sputum is often of more value than examination of the cow. Incidentally, the supposed danger of acid-fasts other than tubercle, even from a dirty wall, is in my experience highly exaggerated. I disagree with Mr. Begg quite violently on another point. He said that no degree of induration of the udder in Lanarkshire herds is allowed to pass without sampling. Later, he said, in describing tuberculous mastitis, that there is no history of a previous febrile reaction, and again that it is rare to find tubercle and a febrile condition co-existent in the udder. Now it is futile to suppose that Mr. Begg is a man without clinical experience and skill. We know he is not, and that he must be able to recognise clinically many indurations of the udder as caused by bacteria other than tubercle. In other words, he can distinguish lesions accompanying or following a febrile reaction, and yet he samples these. I do not know the state of udders in Lanarkshire, but it would be quite impracticable to sample every induration in this country, because the proportion is enormous. On the other hand, I hold that it is not rare to find evidence in a tuberculous udder of a previous attack of an active inflammatory condition. I recently published a series of fifty cases, of which twenty-two per cent. showed evidence, that should satisfy most people, of double infections. Mr. Begg, believing such to be rare, samples every kind of induration, while I, holding that mixed infections are common, leave many indurated udders on clinical judgment alone, which sounds paradoxical, but I still think I am justified."

Dr. C. Crowther said he had nothing very helpful to contribute to the discussion, but having responsibilities in connection with milk production, he was greatly interested in the discussion. There were two herds of dairy cows at the Harper Adams College (of which he is Principal), one of which was tubercle free, and they recently had a mystifying occurrence, four cows in that particular herd relapsing. They could not understand how it came about. They tried the double intradermal test, and he wanted to know what the degree of reliability in this test was. The question was, what is the test really worth? Is it sufficient to use it as the sole basis for guiding your policy in trying to get a tubercle-free herd?

Mr. W. R. Kerr : The four were found by the intradermal test : the other tests were subcutaneous.

Dr. Gepp said he, too, was present as a learner, but he must congratulate the Association on its vitality. In Shropshire, they had nothing like the systematic inspection of dairy cattle that they seemed to have in Lanarkshire. He only wished they had. When the Order first came out, he thought they would have routine veterinary inspection, but the County Medical Officer held the opinion that the Order was permissive. In the interests of economy, therefore, only a few herds are inspected, generally those in respect to which reports had been received.

Dr. Wilson Evans said he thought it was unsatisfactory to send reactors to market. Steps should be taken, if possible, to prevent them being sold and lost sight of. Oswestry for many years had had the benefit of Mr. Hughes' services in the inspection of all cattle supplying milk to the borough. He would like to ask Mr. Begg whether it was of any value to take samples of the ordinary retailer's milk for microscopical examination. Also, did Mr. Begg consider rats in the byre a factor in the spread of disease?

Mr. W. F. Aston raised the question of the chronic cough. He thought there were other reasons, besides tuberculosis, for chronic coughing in cows. He attended three or four tubercle-free herds, and yet one heard a considerable amount of coughing. There was coughing that was due to throat lesions, and also to simple stomach disorders. With regard to old inoculations showing up again after a further test, he had often noticed that himself. The question was often asked as to how long they should isolate first non-reactors before admitting them to a grade A (T.T.) herd. He had said six months. Let them pass two tests before putting them among the other cows. In practice, they must not make the period too long, or else how are people to form Grade A herds?

Mr. H. W. Steele-Bodger referred to the problem of Johne's disease in relation to the Tuberculosis Order, and agreed with Mr. Begg that the two diseases might exist concurrently in the same animal. He wished Mr. Begg had stressed the importance of *post-mortems* being carried out by the veterinary inspector himself. " You may find the carcass hung up and the various organs removed, and you have no evidence that such organs belonged to the particular carcass you have gone to examine." It was not fair to have to rely too much on the honesty of the knacker. He thought, also, that samples of milk should be taken by the inspector himself, instead of leaving it to the farmer. With regard to the biological test, it was sometimes as long as six weeks before the result was known. That was a long time for the farmer to be losing money, especially if the result was negative. He thought there should be some sort of compensation payable. In making the intradermal test, he believed clipping was desirable. He produced the clippers he used, and contended that it was impossible for such clippers to make an abrasion, however restless the cow might be. In the inspection of a grade A herd, he thought it was necessary for the ear-marking to be checked. It was all very well to rely on the honesty of the farmer, but that was not enough. He could not agree with Mr. Begg that it was advisable to advise one's clients to purchase an animal that has recently re-acted to the test. He thought that an animal which had formed part of a tubercle-free herd, and which then fell, was more liable to suffer than any other. Mr. Begg mentioned the use of glycerine broth as a control. He (the speaker) did it, but even then he got tenderness. He had had experience of Ayrshire cattle, and in that particular breed he had noticed great tenderness in handling. He thought Mr. Begg's rules for examination were excellent. They should be hung in the bed-room of every part-time inspector. He pleaded for the appointment of whole-time veterinary officers, to advise and to secure greater co-ordination in veterinary practice.

Mr. H. Burrows invited Mr. Begg's opinion in regard to three-quartered cows. Should a cow which had lost one quarter through an attack of mastitis be allowed to continue as a milk-producing animal? Even in graded herds, some people allowed a three-quartered cow to remain in the herd. He thought that was wrong. What was the position of the veterinary inspector who came across a cow with tuberculous udder at the railway station or on the road? He once met with such a cow at a railway station. Was he justified in taking that cow? There was no provision in the Order for cattle in transit. When examining udders, it was not an easy matter unless the udders were empty. If they were half empty, one got samples from an udder where one thought there was induration, yet if one milked the udder dry one would find that there was no induration at all. The stopping of milk from cows during the month or six weeks necessary for the biological test seemed hard lines on the farmer. It was partly their fault as a profession, because they could not always say for certain whether a cow was suffering from disease, unless it was a really typical case. They could only suspect it, but as they became more proficient they might be able to say more definitely whether it was a case of tuberculosis or not. With regard to the interpretation of results, they must all agree there were cases which were difficult to decide. He preferred to take no notice of what the farmer said, but to take his own readings.

Mr. Howard Dawes said he was surprised to hear Mr. Begg state that in 90 per cent. of cases there were indications of re-action after the first inoculation. On the question of interpretation, even after having listened carefully to Mr. Begg, he had no clearer definition of what constituted a doubtful re-actor, if the term were permissible. It would not be fair to assume that there were no animals which were capable of giving a reaction that was indefinite. Such an assumption would mean that the test was one hundred per cent. efficient. One could not reduce the result of the double intradermal test to a formula of words. It was a great pity that the originators of the test had not continued their work a little longer to define the limits of reaction and non-reaction, and to enlarge upon the question of the interpretation of the test. Mr. Steele-Bodger had raised an important point in reference to Ayrshire cattle, which certainly did show extreme apprehension on approach. There was also an important point mentioned by Mr. Begg—the disposal of cows under the Order. He (Mr. Dawes) maintained that they should be sent to an abattoir or slaughterhouse for the *post-mortem* examination. No proper *post-mortem* under the Order could be conducted in the knacker's yard. In the event of the carcass failing to reveal any evidence of tuberculosis the salvage of the carcass in the interests of the Local Authority was limited. Moreover, the Tuberculosis Order was never intended to deal with the "screw" that was on its last legs. If the Order was applied to animals that were only fit for the knacker's yard, its original purpose was defeated. The Order was unnecessary in the case of such animals. But what had interested him most in the discussion was to hear two members of the medical profession supporting a routine examination of dairy cattle. When every doctor took the same view, the hands of the veterinary profession would be greatly strengthened. Mr. Steele-Bodger was unable to keep off his old hobby horse—the part-time inspector, but it could not be denied that the part-time inspector, with his restricted opportunities, was doing some good towards helping in the elimination of tuberculosis.

Dr. R. Woof took up the question of systematic inspection. The sooner, he said, that local authorities were forced to appoint a sufficient number of inspectors, the better it would be for the health of the community—whether whole-time or part-time. In Worcestershire there was practically no inspection at all. He himself had 30,000 cattle to deal with. He did the best he could, but it was hopeless to try and inspect all of them as they should be inspected.

Mr. J. R. Barker shared the views of Mr. Howard Dawes, that the people who introduced the intradermal test had not finished their job. Referring to the question of coughing, he said it was extremely difficult to interpret it. There were periods of the year when it occurred in most byres—certainly among Hereford cattle—without tuberculosis being present at all. Hereford cattle were fairly free from tuberculosis, and yet they sometimes exhibited a strange cough. One came across it in the autumn—sometimes as early as the middle of July. It was a form of asthma.

The Reply.

Mr. Begg, replying to the discussion, said he had come to the conclusion that the "Midland" was really a live Association, and it was a pleasure to have listened to such an interesting discussion—not all in agreement with him, but welcome, nevertheless. As to the loss of time in waiting for the result of the biological test, he agreed that six weeks seemed too long. In Lanarkshire, they seldom waited more than three weeks. It was generally possible at the end of that period to let the farmer know how he stood. He would not advise any man to say that as the result of the tuberculin test a herd was free from tuberculosis. The man who added to his certificate that an animal was free from tuberculosis was a fool of the first water. He should say "passed the test," and nothing more. He welcomed the pointed criticism of Mr. Matthews, and the points he raised were fair argument, but they could agree to differ. Dr. Crowther had referred to four cows in the grade A (T.T.) herd at his college falling, and he had not the slightest hesitation in suggesting that those beasts were exposed to infection at some time or other. Dr. Gepp referred to the economy that was exercised in Shropshire. He thought it was a pity that so many counties confined their attention to the "screw." As Mr. Howard Dawes had said, it was entirely subversive of the idea of the Tuberculosis Order.

Dr. Wilson Evans referred to the sale of reactors from graded herds, and some other speakers suggested that such animals enjoyed lesser immunity. The initial infection was the major factor, but it was better to buy a reject from a grade A (T.T.) herd, and be told that it was a reactor, than to buy an animal you knew nothing whatever about. As to whether rats spread disease, he contended that anything that could move in the byre was capable of spreading infection. You could not keep a free herd close to a herd that was not free without running considerable risk. A rat could spread infection and so could men moving from one byre to the other.

Dr. Crowther: My two herds are 300 yards apart; and each has a separate personnel. If what you say is true the problem for the practical farmer seems to be insoluble.

Continuing, Mr. Begg emphasised the inherent difficulty of attempting to build up and maintain a tubercle-free herd in proximity to an infected herd.

He then took up the question of the chronic cough, raised by Mr. Aston and other speakers. It was of sufficient interest for a paper in itself, and if Mr. Aston were willing to write one, he (Mr. Begg) would place at his disposal some private notes which might prove helpful. Everyone, of course, knew that there were many cases of coughing that did not betoken tuberculosis. As to how long recently bought non-reactors should be isolated, was a matter of individual judgment. If a beast had been six months in quarantine, that might be long enough, provided it had been re-tested; though there was always the danger of its becoming a reactor later on.

Dealing with Mr. Steele-Bodger's point, about the inspector making the *post-mortem* himself, Mr. Begg said he sent his own animals to the public abattoir, where it was more than a man's place was worth to attempt to mislead. If the inspector feared such a thing was being done, he had the remedy in his own hands—he could refuse to give a certificate. As to the taking of samples, he did not do it personally, but he saw that it was done, and often told the farmer to draw the right teat. He agreed with Mr. Steele-Bodger that clipping could be done without making an abrasion. He (Mr. Begg) did not say "Don't clip." What he said was that you can get the same result without clipping, unless the hair was exceptionally long. Mr. Burrows thought the three-quartered cow should not be

Observations on Glanders at the End of the South-West African Campaign, 1915.

By F. J. Dunning, F.R.C.V.S.
College of Agriculture, Stellenbosch, Cape Province.

Foreword.—This short essay is more historical than scientific. It may be rather belated, as more than a decade and a half have elapsed since the events narrated occurred. One often views things, however, from a better perspective after an interval and loses any existing bias. If an excuse for its recording is needed, it is that it may have some points of interest, more particularly to the younger generation, who may be called upon to face similar conditions on some future occasion.

. . . . . .

At the conclusion of the Campaign, the Burgher and Volunteer Forces were returned to the Union of South Africa by sea and rail with all possible speed. It was really a very expeditious evacuation, leaving only a small army of occupation. All equines, however, were handed over to the Transport and Remount Corps to be repatriated as opportunity occurred. Owing to force of circumstances, this repatriation turned out to be a very protracted business and was not completed until the early months of 1916. Thus an enormous number of animals was suddenly and at very short notice turned over to the care of the Remount and Veterinary Corps. I do not think anyone foresaw this turn of affairs and its portent, which was unfortunate. Everyone in the field appeared to be imbued with the idea that at the conclusion of hostilities each unit would be returned in the same way it had arrived; *viz.*, complete and self-contained in every detail. The final disposal of animals would then be effected in the Union of South Africa. There was good reason for this belief, as most mounted men had taken their own favourite horses and were promised their return if still alive. Lieut.-Colonel G. Lee was Military Director of Veterinary Services and laboured hard to evolve order out of chaos. The Transport and Remount Corps, with the best of optimistic intentions, collected equines at various centres in concentration Depôts along the railway to facilitate transport of feed and supplies and to be ready to entrain on instructions. Water was scarce and grazing in such places non-existent. Crushed mealies were fed in rough troughs or on the ground—often the latter. When hay was obtainable it was scattered in the kraals. Under the circumstances, animals fell off rapidly in condition and glanders soon made its fateful appearance everywhere. It assumed an acute type, of a highly-contagious nature, due to unfavourable conditions and lack of a balanced ration. Further, owing to the animals being short of roughage, the dung, which soon dried in that arid climate, was again eaten by the confined animals, thus assisting undoubtedly in spreading infection. On one occasion an inspecting Medical Officer in Windhoek asked me how often horse kraals were cleaned out. I replied, maybe facetiously, that they were not cleaned out, as it would deprive the horses of necessary roughage pending the arrival of a regular hay ration. (This retriturated vegetable matter was eventually reduced to powder and blown away by the winds, thus at that time obviating any necessity to clean out the kraals.) A further point worth mentioning is that, because of the method of feeding and the habit the animals acquired of picking up all dried ingesta and vegetable matter from the ground, an enormous amount of sand was consumed. In some cases a bucketful or more could be removed at a *post-mortem*. Now, as glanders is principally acquired through ingestion, it can easily be understood that this sand favoured infection by keeping up a continual bowel irritation. This view is quite in accord with the findings of scientists experimentally.

Donkeys affected with glanders often showed it in a peracute form. The symptoms were a severe nasal discharge, hurried respirations, high fever, swelling of dependant parts and genital organs, with death in some cases within twelve hours from observation of clinical symptoms. It was sometimes mistaken for horse sickness or anthrax. *Post-mortem* examination revealed a specific generalised pneumonia with grey glanderous patches and a generalised septicæmia.

When, eventually, a proper programme of campaign was decided on and a sufficiency of mallein obtained, the intra-palpebral test was used and gave excellent results; in fact, its efficacy when dealing with numbers of equines cannot be too highly praised. By its means it can be claimed that the disease was satisfactory eradicated. Although glanders had assumed the character of an epidemic, yet one bright spot, when reviewing the campaign aftermath, was that repatriated equines did not cause outbreaks in the Union of S.A.

Where in some cases grazing farms were obtained and equines turned loose, the disease was very easily controlled and eradicated. At one time, as the return by train was such a protracted job, the suggestion as to the practicability and advisability of trekking the animals back to the Union across country in droves was mooted, and recommended. After mature consideration, however, it had unfortunately to be turned down as they were physically unfit to stand the journey, the route lying across the waterless Kalahari with little natural grazing. The South-West African campaign consisted principally of rushes and forced marches by irregular mounted troops covering a wide area and with few lines of communication. Veterinary services were of secondary consideration in the field whilst the short-lived actual military operations were in progress. A bullet was the best medicine for an animal which could no longer be used when on the march, and the existence of

---

allowed in a grade A herd, but he did not see much reason to differentiate between a grade A cow and any other in that respect. Certainly it was best to examine an udder when it was empty, but you could not get through the whole lot if you waited till each cow had been milked. He was interested in Mr. Barker's reference to Hereford cattle, and also in the point which Mr. Howard Dawes raised about the Ayrshire breed. He could assure Mr. Dawes that 90 per cent. of animals tested were detectable in 24 hours, surprising as the statement might appear. As to the case of the doubtful reactor, it was quite true that such existed. Such animals could be isolated, however, and re-tested. Mr. Dawes was right when he said that *post-mortems* should be conducted at the abattoir. Personally, he never went to the knacker's yard; the animal that was sent there could not surely be in doubt. The whole trend of public opinion was in the direction of a systematic veterinary inspection, and the laboratory examination of milk samples. That was all to the good, both from the point of view of the community and of their own profession.

glanders was not suspected or recorded until after the campaign. It then suddenly appeared as an epidemic of such a threatening nature that even malicious spreading was suggested, but investigation did not bear out the suspicion.

If there were any deductions to be drawn or lessons to be learned from the campaign, I would suggest the following.

When large numbers of animals are suddenly brought together from many different Corps or Forces under such conditions in concentration camps at the end of a campaign, serious epidemics can certainly be expected and should be anticipated.

Where it is impossible to make provision for coping with such unusual conditions by proper feeding, regular inspection and immediate malleining, the remedy should be to turn animals out immediately on to suitable farms in the vicinity of rail or good motor communication. This would decentralise them sufficiently to prevent endemics becoming epidemics. In the case under review, it might have solved to a big extent the feeding question by reducing the amount of feed which had to be brought, in the face of many difficulties, from the Union. It would also have reduced the risk of serious mortality from epidemics and debility. Amongst equines turned loose on farms, clinical cases of glanders could be destroyed at once. The disease would thus hardly spread, and testing could be undertaken when mallein and veterinary services became available. In my experience, glanders does not assume an epidemic form amongst animals with marching troops or free range animals, although, of course, an isolated case may now and again be detected and summarily dealt with. It assumes its worst aspects under close contact conditions of stables, depôts and military camps, and the experience in South-West Africa was no exception to this statement.

"Warbles" in Man.

In a recent issue of the *British Medical Journal* "F. L. M." writes: "I have just had a most unusual case. A boy of five was brought to me with the history that he had had within the last few days two itchy and painful swellings, one just above the right ear and one over the left shoulder blade. The mother had squeezed them and had ejected two large white maggots, one of which was brought to me for examination. The swellings are large and pale, but not much raised, the one on the shoulder measuring 2½-in. by 1-in. On each is a small clean puncture, which admits a probe to a distance of about an inch. Serum can be expressed on squeezing. There is a history of a bruise on the head from a cow's horn, but there is no indication of injury to the shoulder and no sign of external abrasion anywhere likely to be infected by flies, and, in any case, this is not the fly season. The child is well nourished, strong, and healthy in every way; the parents are small farmers, and he is constantly in contact with cows, horses, and farm stock generally. The maggot brought to me is pure white, about half an inch long, and appears to have eight segments. I believe there is a common disease in cattle and deer due to fly, known locally as "warbles," in which lumps appear containing maggots, but I have never heard or read of a similar case in man. Can any reader state what larva this is likely to be, what was the probable method of infection, and what is the best treatment to get rid of any further manifestations?"

The Veterinary Record.
January 3rd, 1931.

1931.

"There's a new foot on the floor, my friend,
And a new face at the door, my friend,
A new face at the door."—*Tennyson.*

At this season of the year it is customary to express to our members the old and time-honoured wish. Though one may regret the passing of years and the old order of things, yet the giving place to new is the sphere in which all progress is activated. Metaphorically speaking, it is our earnest wish that the new foot on the floor of A.D. 1931 may be planted with that firm determination to do our utmost, individually and collectively, to advance our profession in knowledge and scientific application, and that the face at the door should radiate that Christian charity and resolve to help each other and to watch over those whom misfortune has placed in circumstances of distress and consequent suffering.

In both these aspects of our well-being we rejoice to see a fuller appreciation, and our *first-foot* of 1931 is along the path of encouragement and support. In the issue of December 20th our readers will have noticed the splendid effort which is being made by Lieut.-Colonel P. J. Simpson, Hon. Secretary of the Victoria Veterinary Benevolent Fund, to add to the capital account of that Fund. To be of any practical good, the capital account must be increased to greater proportions than at present existing. It is hoped that Colonel Simpson's endeavour on the 8th inst. will be in accordance with the title of his play "The Happy Ending," and that his example will be followed by others in various cities and towns. Histrionic art may not be the metier of the average veterinary surgeon, but there are other ways of raising fund money, and every advantage of occasion should be taken to further so laudable an object.

Perhaps in no way is Lord Tennyson's simile more applicable than in the proposals which are now on foot to extend the period of veterinary training by another year. Subjects are now so comprehensive and varied that to provide for adequate scientific veterinary knowledge in all its bearings, a recast of the curriculum is practically forced on the Royal College of Veterinary Surgeons, and the year 1931 will see this desirable measure well on its way for accomplishment in 1932.

Lastly, but by no means least, the Governors of the Royal Veterinary College, Camden Town, are anxiously looking for a new face or new faces at the door, beaming with benefactions and subscriptions, to enable the College to be in a position to arrange with Government in regard to the rebuilding scheme in the near future.

Eleventh International Veterinary Congress, London,

August, 1930.

Abridged Papers.

(*Continued from Vol. X, No. 52, page 1210.*)

The Use of Drugs in the Treatment of Diseases caused by Nematode and Trematode Worms.

By E. Leonard Taylor, B.V.Sc., M.R.C.V.S., D.V.H., Veterinary Laboratory, Ministry of Agriculture and Fisheries, Weybridge.

This paper deals with the subject under the four headings: "Methods of investigation," "Methods of diagnosis," "Technical knowledge relating to the use of anthelmintics," and "Treatment for parasites in various positions in the animal body."

In his preliminary remarks, the author mentions that the use of anthelmintic drugs dates back to very early times, and recalls the interesting point that two of the oldest, namely, chenopodium and male fern, are still amongst the best of those known at the present day. One has only to read the able reports before the Veterinary Congress of 1914 to appreciate the lack of an experimental foundation for the subject, and the consequent unreliability of what information wa available at that time. The period 1914 to 1930, which is reviewed in the paper, may be regarded as the beginning of the scientific study of anthelmintic treatment which has been successfully fostered at the United States Bureau of Animal Industry, under the direction of Ransome, and of Hall; and it is the investigations of the last-mentioned worker which, in particular, have done so much to clear away the previous perplexity.

Under the heading of "Methods of investigation," the author gives a short review of the various means which have been used for discriminating between efficient and useless anthelmintics, and leads up to the method used by Hall. In applying this method, a dose of the drug under investigation is given to the test animal, after which all fæces are examined for the purpose of collecting expelled worms. It may be necessary to continue this search for some days, as the worms come away gradually. The next operation is to kill the test animal and collect all worms not expelled by the drug. The two lots of worms are then identified, and the numbers of the various species counted, the efficiency of the drug being afterwards expressed as a percentage of worms removed. While this method of testing an unknown drug has its limitations where very small worms are concerned, and particularly with those situated in the first part of the lengthy intestine of herbivores, it has been of immense value and it was largely through its application that Hall was able to take a very important step in the control of worms by drugs, and to demonstrate the actual value of the many varied substances for which vermicidal properties have been claimed.

This paper also draws attention to tests *in vitro* by the use of living parasitic worms in physiological solutions *plus* the anthelmintic, the reactions of the helminth tissue being recorded by means of the kymograph. The advantages of such a test are obvious. Up to the present, however, results have been rather disappointing, but the method should not be condemned too soon, as it may prove a useful aid to the pharmacologist in finding a rational physical or chemical basis for the study of anthelmintic action. Theories for anthelmintic action are mentioned, and it is concluded that further knowledge of pharmacological actions in general is required before we can hope for any satisfactory explanation. Until this knowledge is forthcoming our only key to aid the search for more active anthelmintics is the association of efficiency with some part of the molecular structure of drugs already known to be more or less potent. This may lead to the discovery of allied substances which have a more powerful action, but further afield the search remains at the low level of a method of trial and error.

Under "Methods of diagnosis," the author calls attention to the importance of a more exact diagnosis than is usually thought sufficient. The kind of worm present should be determined, because anthelmintics are more or less specific in their action, and an idea of the numbers of worms present should also be obtained before verminous disease is diagnosed and anthelmintic treatment prescribed. Some methods of concentrating the eggs and of estimating their numbers per unit weight of fæces are mentioned by name, and it is said that all of these might be applied with advantage in the practice of veterinary medicine. In many instances, however, direct examination is to be preferred over concentration methods, as by the use of these large numbers of eggs are collected together, even in light infestations, and the examination robbed of its quantitative information.

The third subdivision of the paper deals, firstly, with peculiarities of the alimentary tract of the various domestic animals and birds and the influence which they have on anthelmintic action. The large size of the cæcum and colon of the horse, and the comparatively small size of the stomach and small intestine result in drugs hurrying to the cæcum, so that treatment for strongylids is unexpectedly efficacious, but is more difficult for ascarids than in other animals. The four stomachs of the ruminants and the specific peculiarities of the cæcum of some animals are other significant anatomical peculiarities.

The importance of proper purgation after anthelmintic treatment is then dealt with. Castor oil, calomel, and magnesium sulphate are mentioned as being particularly valuable, as they appear to have some special protective action, while liquid paraffin and olive oil decrease anthelmintic effect. The purgative dose should be given along with, or immediately after, the anthelmintic, and not withheld for an hour or so as was at one time thought advisable.

Contra-indications are briefly dealt with, debility being mentioned as one of the most important, the debility caused by a heavy worm infestation not being excluded. Fats and alcohol are contra-indicated because they assist absorption of the anthelmintic, while pregnancy is mentioned as a special contra-indication for the use of chenopodium. Special reference is made to the peculiar poisoning which very occasionally follows the use of carbon tetrachloride, and which appears to have some association with calcium deficiency. Where a flock of sheep is to be dosed with this drug, it is advised to treat a few members before mass treatment is commenced.

The next part of the paper deals with treatment for the particular parasites of the various organs of domesticated animals. The parasitic worms of the lungs and air passages are still beyond control by drugs; intratracheal injections, which are popular in some places, being regarded as valueless. Parasites of the circulatory system have only one representative in this country, namely, the larval stage of *Strongylus vulgaris* in the horse; up to the present time that worm is inaccessible to drug treatment until the mature stage appears in the large intestine. Some success has been obtained by the use of tartar emetic for schistosomiasis in sheep, while the same drug is reported to have some value in filariasis of dogs. Parasitic worms in muscle and connective tissue are still beyond drug control. Carbon tetrachloride in doses of 1 c.c. is cited as the best treatment for Fasciola in sheep; it is, however, to be regarded as a dangerous drug for cattle. Reports on the trials of various drugs for fascioliaris of cattle are contradictory, and it can only be concluded that further research is indicated. No successful treatment has yet been found for Dicriciclium. The advance in the treatment of fascioliaris of sheep must be regarded as a step of great practical importance, as it has brought under control what, in the past, has been the most serious menace to large numbers of sheep farmers throughout the world.

In dealing with the parasites of the intestine, oil of chenopodium is given as the most effective drug for use against the ascaris worms of the dog, cat, and pig. The dose is given as 0·1 c.c. per kilo. of body weight for the dog, half that amount for the cat, and 1 c.c. for every 25 lb. in the pig, the total dose never to exceed 8 c.c.

By way of preparation for the dose, the patient should receive no solid food for 12 or 18 hours previously, while an adequate dose of some suitable purgative should follow immediately afterwards.

Next in order of efficiency is tetrachlorethylene, and only slightly less efficient is carbon tetrachloride; while santonin has an indicated efficiency of only 27 per cent. For the removal of ascarids from the horse, carbon bisulphide is the best proved drug; the dose is 20-25 c.c. after a 12-hours' fast. No purgative is required after this drug, which has a purging action of its own.

Fortunately, dogs do not suffer from hookworm in this country, but where they do, carbon tetrachloride and tetrachlorethylene have proved very successful remedies for this worm, both in the dog and in the cat, tetrachlorethylene being much the safer drug for the cat. Successful results have also been claimed from the use of carbon tetrachloride for hookworm in sheep, but pigs do not tolerate this drug well and oil of chenopodium is advised.

No effective treatment is yet known for œsophagostomes.

Excellent results have been obtained with chenopodium for "red worms" in horses. The subject for treatment should be fasted for 24 to 36 hours before the dose of 16 to 18 c.c. is given, and a large dose of linseed oil should accompany or immediately follow. This treatment removes between 95 and 100 per cent. of the worms present. Carbon tetrachloride in doses of 60 c.c. is a little less efficient, while turpentine only removes about half of the worms.

There has been little advance in the treatment for the trichostrongyles of the fourth stomach and small intestine of ruminants, since the introduction of copper sulphate in 1892; the twisted wireworm is satisfactorily removed by this drug, as it also appears to be by carbon tetrachloride, but for the other species of these worms no treatment can yet be said to have proved quite satisfactory.

Chenopodium has given good results for oxyurids in the horse, while there are favourable reports of its value in poultry, Hall having removed 90 per cent. of the oxyuroid worm of fowls by rectal injection of chenopodium in bland oil.

There is still no satisfactory treatment for whipworms, which, however, do not appear to do much harm.

The paper concludes with a short account of the most important nematode and trematode parasites for which no satisfactory treatment is yet known.

The Use of Drugs in the Treatment of Diseases caused by Nematode and Trematode Worms.

By Maurice C. Hall, ph.d., d.sc., d.v.m.
Chief, Zoological Division, Bureau of Animal Industry, United States Department of Agriculture, Washington, D.C.

In his introductory remarks, the author, whose work on the subject is of world-wide reputation, calls attention to the importance of a broad background of education and experience, and the possession of a sound judgment and ability for putting together the factors of patient and drug with the desired result in the form of the destruction of parasites. He deplores the inadequate instruction at veterinary colleges in the use of anthelmintics and the absence of up-to-date text-books, the veterinarian being left to familiarise himself with the publications scattered in several different languages, or learn by costly experience how best to handle the dangerous anthelmintic drugs.

The main part of the paper is given to an account of treatments, many of which have been developed through critical testing of the drugs carried out by the author and co-workers at the United States Bureau of Animal Industry. It is pointed out that some of the treatments current in the literature are not considered in the paper, either because they have been found unsatisfactory or have not been tested and lack evidence of efficiency, while some of those considered are mentioned because the evidence of their value as presented in the literature appears to be good.

The author discusses the subject under four headings:—(I) Treatments for the removal of Nematodes; (II) Treatments for the removal of Trematodes; (iii) Theoretical aspects of anthelmintic medication; (IV) Conclusions.

I.—Treatment for the Removal of Nematodes.

(*a*) Nematodes of Solipeds.

Ascarids.—Carbon bisulphide in capsules is recommended; the dose is given as six fluid drams, no purgative being required. An alternative treatment is 6 to 12 drams of carbon tetrachloride given with a purgative dose of magnesium sulphate.

Redworms.—Four to five drams of oil of chenopodium is recommended, a full purgative dose of linseed oil being given immediately beforehand. Gastro-enteritis and pregnancy are mentioned as contra-indications. Carbon tetrachloride is an alternative treatment, but for Cylicostomes is not so efficacious as chenopodium.

Pinworms or Oxyurids.—Treat as for redworms, or give two fluid ounces of turpentine with a full purgative dose of linseed oil.

Stomach Worms.—Carbon bisulphide, carbon tetrachloride or tetrachlorethylene are indicated for further test. Gastric lavage by the stomach tube to remove the mucous which protects the worms should first be carried out.

For Nematode Worms in General.—Horses may be given a treatment with carbon bisulphide, followed two weeks later by treatment with oil of chenopodium.

(*b*) Nematodes of Cattle.

Stomach Worms.—A one per cent. solution of copper sulphate, to which may be added a 40 per cent. solution of nicotine sulphite at the rate of one ounce to every gallon (3·8 litres, the American gallon being smaller than the Imperial gallon). The dose for adult animals is one quart.

Ascarids, no treatment established by critical test.

Hookworms, no treatment established by critical test.

Small Trichostrongyles of Fourth Stomach and Small Intestine.—No treatment established.

Nodular Worms.—No treatment established.

(*c*) Nematodes of Sheep and Goats.

Twisted Wireworm.—Give 3½ fluid ounces of the solution of copper sulphate and nicotine advised for cattle. Carbon tetrachloride or tetrachlorethylene 5 c.c., followed immediately by dry sodium sulphate, sufficient to fill a 5 c.c. capsule, is recommended as an alternative.

Hookworms.—Treatment as for stomach worms.

Small Trichostrongyles.—No effective treatment established.

(*d*) Nematodes of Swine.

Ascarids.—Oil of chenopodium, 2 to 4 c.c. for 100-lb. pig, to be immediately preceded by at least 2-oz. of castor oil.

Stomach Worms.—Oil of chenopodium as for ascarids.

Nodular Worms.—No treatment established.

Trichina.—No treatment established.

(*e*) Nematodes of Dogs.

Ascarids.—Oil of chenopodium, 0·1 c.c. per kilo of dog's weight, preceded by 1 oz. of castor oil. Distemper, severe mange, and gastro-enteritis are contra-indications. To pups, give only 1 to 3 minims, with an ounce of castor oil.

Alternative treatments: Carbon tetrachloride at the rate of 0·3 c.c., or tetrachlorethylene at the rate of 0·2 c.c. per kilo of dog's weight, dry sodium sulphate in capsule being given as a purgative.

Hookworms.—Carbon tetrachloride or tetrachlorethylene as for ascarids, tetrachlorethylene being especially indicated for pups.

Whipworms.—Santonin in small daily doses over a period of seven to ten days.

(*f*) Nematodes of Cats.

Ascarids.—Oil of chenopodium 1 to 3 minims, preceded immediately by 1 oz. of castor oil.

Hookworms.—Tetrachlorethylene 0·2 c.c. per kilo; purgative usually not necessary.

(*g*) Nematodes of Chickens.

The Large Round Worm.—Oil of chenopodium, 0·3 c.c. in castor oil 3 c.c. Alternative treatment, carbon tetrachloride or tetrachlorethylene 2 c.c.; no purgative.

The Cæcum Worm.—Rectal injections of 0·1 c.c. chenopodium in 5 c.c. of bland oil.

Capillarids.—Carbon tetrachloride or tetrachlorethylene 2 to 5 c.c. will destroy some of the worms.

(*h*) Lungworms, Filarids, Spirurids, etc.

Up to the present time no satisfactory medical treatment has been established, and although considerable work has been done on the treatment for human filarids, these worms have been neglected in veterinary medicine.

II.—Treatments for the Removal of Trematodes.

(*a*) Liver Fluke.

It is pointed out that Grassi and Calandruccio in 1884 and 1885 established the value of male fern for fascioliasis in sheep, which discovery, after having been lost sight of for 20 years, was re-established by Railliet, Henry, and Moussu in 1911, since when its use has been quite extensive. In 1923 Hall and Shillinger stated that carbon tetrachloride had not been tested for fascioliasis and that it might prove effective. Marek had previously used this drug as a solvent for male fern, but had abandoned the combination because of heavy losses which occurred. In 1926 Norris in Ireland and Montgomerie in Wales reported that carbon tetrachloride was effective in the destruction of liver flukes in doses of 1 c.c. Attention is called to Opel (1927) who states that a commercial firm in Germany tested this drug for fascioliaris in 1925, but Hall notes that all the work on the subject is discussed under the names of proprietary preparations, so that it was impossible for an outsider to follow it.

Although carbon tetrachloride appears to be tolerably safe for calves, it is unsafe for mature cattle, and particularly for milking cows. There does not appear to be any well-established treatment for use in cattle, but the reports on hexachlorethane appear to be the most promising.

(*b*) Schistosomiasis.

Although there is an extensive literature on the treatment of this disease in man, too little work has been done in animals to regard any treatment as of established value. Work by Cawston, 1921 and 1928, and by Fairley in 1924 is mentioned which indicates the value of emeterie and tartar emetic.

(*c*) Intestinal Flukes.

The satisfactory results obtained with carbon tetrachloride in foxes, and the unsatisfactory results with the same drug on the small fluke which causes salmon poisoning in dogs are mentioned.

III.—Theoretical Aspects of Anthelmintic Medication.

Early tests by Hall and Wigdor and by Caius and Mhaskar aiming at a correlation between chemical and physical properties of drugs and their anthelmintic efficiency are mentioned. Hall assumed that since chloroform was anthelmintic for hookworms a related chlorinated hydrocarbon might be as good or better, and this assumption finally led to the discovery of carbon tetrachloride. Later work by Hall, Hall and Shillinger and Hall and Cram attempted to correlate efficiency of drugs allied to carbon tetrachloride, with water solubility and chlorine content, and it was indicated in a general way that the anthelmintic efficiency of chlorinated hydrocarbons varied as the amount of chlorine present, and that there was a point of optimum solubility, the more soluble substances being too readily absorbed and thus losing anthelmintic value and exerting unfavourable systematic effects, the less soluble substances not being available for action on the worms. Unpublished work by Wright and Shaffer is mentioned in which it is

shown that in addition to other factors already known, the anthelmintic efficiency and toxicity must be correlated with the length of the chain, and the position of the chlorine in the chain.

IV.—Conclusions.

In his concluding section, the author mentions some of the parasitic worms for which no treatment has yet been found, and states that a scientific basis for the future development of anthelmintics by the formulation of correlation between anthelmintic efficiency and the chemical composition and physical properties of drugs is being established, and that important developments of the future are likely to proceed from such investigations.

E. L. T.

Testing of the Anthelmintic Efficacy of some Vermifuges against Nematodes of Animals.

By Dr. R. Ed. Schulz.
Principal of the Helminthological Institute, Moscow.

1.—In the Helminthological Institute of the Commissariat of Agriculture of the U.S.S.R. (President: Professor K. J. Skrjabin) a systematic testing of the anthelmintic action of some vermifuges is now being carried out. Hitherto the following were tested: Santonic acid and its derivatives —desmotroposantonin, santonin - amid, acetyl - santons, santonin-acid, sodium salt of santonic acid, etc.— carbon tetrachloride, " Macnin " (a Japanese vermifuge), and also some purgatives—calomel, Glauber-salts, phenolphthalein.

2.—Tests were conducted on: 250 cats, 40 dogs, and 100 horses. Experiments with pigs are yet in the initial stage. For the experiments cats were mostly employed, and used for testing the whole range of drugs and new combinations in the preliminary laboratory investigations.

3.—The following results were obtained in experiments with various drugs:—

(*a*) With santonin by suitable dosage and method of administration, one can achieve great effect against Ascarides. It is necessary to control and modify the dosage of santonin as far as its increase is concerned. In cats, the best effect is produced by ·25 gr. of santonin, together with calomel, its efficacy being 98 per cent., that is to say, that 98 per cent. of the actual number of Ascarides were expelled. The efficacy also depends on the kind of purgative used; the same dose of santonin—·25 gr.—with the Glauber salts gave only 51 per cent. of the full effect. Santonin without purgative produces a weaker effect—·50 gr. of santonin with calomel ·66 per cent. of efficacy and the same dose without it only 15 per cent. Preliminary fasting plays an important part: ·25 gr. of santonin without preliminary fasting shew only 62 per cent. of efficacy, while the same dose given on an empty stomach produces 98 per cent. effect.

(*b*) Against a lungworm *Eucoleus ærophilus*, santonin fails altogether, even repeated doses destroying no worms. Likewise, santonin is useless against Ankylostomes and Cestodes.

(*c*) Purgatives possess, *per se*, a certain effect against Ascarides; for instance, ·025 of calomel shews two per cent., and ·05 of calomel shews 16 per cent efficacy. A smaller percentage of Ascarides is expelled by sodium sulphate.

(*d*) All derivatives tested act in a smaller or lesser degree against Ascarides.

(*e*) Cats tolerate very large doses of santonin; they survived even after doses of 3-5 grammes. A cat succumbed after a subcutaneous injection of 5 gr. of sodium salt of santonic acid, having tolerated, however, 4 gr. The therapeutic dose lies well below the lethal one.

(*f*) A Japanese drug, " Macnin," claimed to be a specific against Ascarides, was shewn to possess a very weak efficacy: ·5-2·0 gr. (human dose), without a purgative, as directed by the manufacturers, gave 0-12 per cent. efficacy; together with sod. sulph. or calomel gave 15-27 per cent. results; after repeated dosage—28 per cent. effect.

4.—On dogs only a pure santonin in various doses, with or without purgative, was tested. The doses for dogs must be likewise increased. Thus, ·03 gr. per kg. of body-weight gave 62 per cent. efficacy.

5.—On horses were used doses of santonin from 5 to 50 gr., with or without laxatives. A complete expulsion of Ascarides was not achieved in the majority of cases, even with larger doses. On the other hand, it was shewn by experiments that great numbers of Strongylidæ (Trichoneminæ) were expelled after the giving of santonin. Carbon tetrachloride was shewn to be a good remedy against equine Strongylidæ; given in suitable doses, it can in many cases free the intestines from parasites entirely. One could recommend for adult animals 100-150 c.c. (Schulz and Rajewsky) this quantity being well tolerated by horses. The most frequent method of administration is through a naso-pharyngeal sound.

6.—Experiments with pigs are in the initial stages only (March, 1930). Preliminary data tend to shew that in pigs also larger doses of santonin, to achieve a marked effect, should be recommended. Increased doses of santonin are well tolerated by pigs: 8 gr. produce perceptibly no injurious effect.

Summary.

Experiments with certain anthelmintics carried out on some 400 animals allow the following conclusions to be drawn:—

Santonin and its derivatives are specific anthelmintics against Ascarides, and the therapeutic doses are much smaller than the lethal doses. The dosage of santonin for dogs, cats and pigs requires revision in the sense of increasing the doses. The efficacy of santonin depends less upon the dose than on the purgative given with it, and the manner in which it is given. Santonin is least efficacious against the Ascarides of the horse, but this drug expels a considerable proportion of Strongylidæ. Carbon tetrachloride is to be considered the most effective anthelmintic against the equine Strongylidæ.

H. F.

Foot-and-Mouth Disease in Malaya.

In the course of 1929 there was a large increase in the number of cases of foot-and-mouth disease reported from each of the Federated Malay States except Pahang, says the annual Report of the Veterinary Branch of the F.S.M. Medical Department. The customary quarantine orders and restriction in the movement of cattle and buffaloes were enforced, and disinfectants were issued. Encouraging results were obtained by adding potassium permanganate to the drinking water.

Clinical Report.

Foot-and-Mouth Necrosis in Sheep.

By Z. Morcos, M.V.Sc., F.R.C.V.S., D.V.H., Professor of Bacteriology, School of Veterinary Medicine, Cairo.

History.—An ulcerative outbreak occurred among a flock of 500 sheep. The disease was reported as foot-and-mouth disease. The following was found on investigation :—

Only sheep suffered; cattle, buffaloes, horses, mules, donkeys and fowls on the same farm were not affected. The sheep were on a separate field to the other animals mentioned above.

Symptoms.—Confined to feet and mouth. Grey-greenish-looking ulcers were seen between the slit of the hoof and above the heels, but the hoof was not separated.

Ulcers were also seen on the lips, gums, tip and superior surface of the tongue; on rare occasions ulcers were seen in the pharyngeal cavity. Ulcers were not seen on the hard palate of the upper jaw. Most of the cases showed mouth ulcers; few had both mouth and feet ulcers, and very few had feet ulcers only, when they were unable to stand on their feet, crawling on the knees. The ulcers had an almost characteristic smell, that of a decayed tooth, green in colour, penetrating, hard, not bleeding. The owner lost all those heavily infected, but the disease was stopped on isolation of the infected and on changing the grass field used.

Examination.—The upper layer of the ulcer was cleaned with alcohol; with a sterile scalpel deep scrapings were made; films were prepared and sterile swabs soaked with the exudate.

Films.—Gram positive, long, slender, slightly-curved bacilli in great numbers and a few Gram positive cocci.

Cultures.—Aerobically incubated media revealed various cocci, coli and *B. subtilis*.

On culture media, inoculated with the swab taken from the lesions, heated at 80° C. for 85 minutes and anærobically incubated, a heavy culture, with a fair amount of gas formation, was obtained after 48 hours. On examination of the anærobic growth, a pure culture of a long, slender, 10 to 15 microns long, by 0·3 to 0·5 micron wide, Gram positive, non-sporulating, rounded-ended bacilli, were seen.

Animal Inoculation.

Guinea-pig 1.—Inoculated at one hind pad intradermally with an emulsion of the ulcer scrapings taken from the affected sheep.

Result.—A blister was seen at the seat of inoculation on the third day, almost indistinguishable from the foot-and-mouth disease blister; but no secondary blisters were seen on the fore feet or the non-inoculated hind feet. The animal was destroyed on the sixth day of inoculation. *Post-mortem* revealed no secondary ulcers or blisters in the oral cavity.

The hind pad was inoculated, examined, cultures anærobically incubated and the previously described bacilli were recovered.

Guinea-pig 2.—Inoculated intradermally with Seitz filtrate of 1/20 blister contents of guinea-pig No. 1, with negative result.

Guinea-pig 3.—Inoculated intradermally with the anærobic culture obtained from the lesions of the affected sheep. Three days following, a blister formed at the seat of inoculation. Seven days later, the guinea-pig was destroyed and no secondary lesions were seen.

Guinea-pig 4.—Inoculated intradermally with blood of guinea-pig No. 1. The blood was taken on the third day of inoculation on the appearance of the blister. Guinea-pig No. 4 was kept under observation for 21 days without any signs of disease or blister formation.

Guinea-pig 5.—Inoculated intradermally with blood taken from guinea-pig No. 4, three days after its inoculation.

Guinea-pig No. 5 was kept under observation for 21 days and no signs of illness or blister formation were noticed.

. . . . . .

Summary.

An anærobic, heat-resisting, non-sporulating, Gram positive, long, slender bacillus causes necrotic ulceration of the oral cavity and feet of sheep.

The bacilli are pathogenic to guinea-pigs on intradermal inoculation.

The disease may be differentiated from the Foot-and-Mouth Disease Virus by the following :—

(*a*) The Absence of Secondary lesions on intradermal inoculation into guinea-pigs.

(*b*) The blood of the infected guinea-pig is not infective on intradermal inoculation.

(*c*) The nature of the ulcer, its characteristic smell, and absence of blisters on the hard palate of the upper jaw of the affected sheep.

H.M. Stationery Office Publications.

The undermentioned have been published recently. Copies can be purchased through any bookseller, or directly from H.M. Stationery Office, at the following addresses :—London : Adastral House, Kingsway, W.C.2, and 28, Abingdon Street, S.W.1; Cardiff : 1, St. Andrew's Crescent; Manchester : York Street; Edinburgh : 120, George Street.

	Price Net.	*Post Free.*
	s. d.	*s. d.*
House of Commons Bills :—		
80.—Exportation of Horses	0 1	0 1½
Empire Marketing Board :—		
Reports :—		
35. The Relative Values of Cod Liver Oils from various Sources. December, 1930 (70-0221-35-00)	1 0	1 4

"The Problem of the Unwanted Calf" was the subject of a broadcast talk from Edinburgh by Mr. A. D. Buchanan Smith, of the Animal Breeding Research Department. In Scotland alone, he said, there must be born every year about 70,000 unwanted calves. In England the figure was much larger. Estimating conservatively, they could reckon that in Great Britain and Ireland there were born every year some one million calves which nobody wanted.

When is a stallion "adequately prolific"? Under the Horse Breeding Act, 1918, authorities have power to refuse licence to stallions "inadequately prolific." No one, up to date, has been able to define these terms.—*Scottish Farmer.*

Reviews.

["**The Early History of Veterinary Literature and its British Development.**" Smith, Major-General Sir Frederick, K.C.M.G., C.B. Fellow and Hon. Associate of the Royal College of Veterinary Surgeons. Vol. III. The Nineteenth Century, 1800-1823 (reprinted from the *Veterinary Journal*, 1929-30). pp. VII+184, with 6 plates, 1930, London: Baillière, Tindall & Cox. 15s.]

Volume III of Sir Frederick Smith's great work embraces an account of the writings of a critical period in the history of the veterinary profession. The author has, in addition to describing the published literature of the period, more or less in detail, given us a concise biography of the writers themselves, paying particular attention to the part each played in the making of the profession. Beginning with *Moorcroft*, who, in addition to leaving records of his observations in glanders and farcy (he held they were due to an identical poison and that the dried discharge retained its virulence for months) became an explorer in India, where he died, we are taken through these unpleasant years when veterinary matters were sadly neglected owing to nothing more or less than professional jealousy of the worst kind, to the time of *Youatt* and *Percivall*, through whose efforts the profession was put on a solid basis. The volume recounts the state of the Royal Veterinary College under the professorships of *Coleman*, who succeeded in obtaining authority to reduce the three years' training approved under Sainbel, to a course of three to six months, and his successor, *Sewell*, who was a true disciple of Coleman, and who, though a keen observer, was found unprepared to deal with the disastrous outbreaks of foot-and-mouth disease and cattle plague when they occurred. In addition to accounts of important writings of the period, many details of the lives and writings are given of pioneers such as *John Lawrence*, who was so disgusted with Coleman's capabilities and attitude that he suggested that "medical students should receive some training in veterinary medicine and when in practice for themselves, have a farrier or cow leach under them"; *Blaine*, who was one of the first to undertake the treatment of cattle, sheep and dogs, and who wrote much on canine distemper and rabies and advertised largely and sold much of his "specific for distemper"; *James White*, in whose mind the prevention of disease and hygiene were always present, and who will always be remembered by his early experimental work in connection with glanders; *Richard Lawrence*, who was the first to attempt to formulate some scheme in connection with veterinary jurisprudence, always advising against lawsuits and who was of the opinion that "if the positive absence of all blemishes be demanded as the criterion of soundness, such a measure will exclude three-quarters of the horses in the kingdom"; *Peall*, veterinary professor to the Dublin Society, at a salary of £100 a year; *Skellett*, who wrote extensively and intelligently on parturition of the cow, as did *Parkinson* of the ewe. From this work also we are shewn the debt of gratitude we owe to *Youatt*, whose object in life was to see diseases of *all* animals taught in the Veterinary College. He gained his ambition in that in his time a chair of Cattle Pathology was created in the College. He was an organiser of Veterinary Associations, beginning with the Veterinary Club, and in 1844, saw the Charter of Incorporation granted. His interests were all for the advancement of the profession, as evidenced also by his being appointed Veterinary Surgeon to the Zoological Society of London and to the Society for the Prevention of Cruelty to Animals. The description of the work of *Percivall* is also a feature of the volume. It was he who started that periodical—*The Veterinarian*—to which reference is so often made to-day.

In this work Sir Fred Smith again gives evidence of his untiring energy. To collect the data produced must have meant many hours of labour—no doubt pleasant to a man whose life was so intimately bound up in the interests of his profession. He has spared no effort to collect all available information on his subject nor to present it in a manner which makes such pleasurable reading.

This volume, with its predecessors, should find a place in the bookcase of every member of the profession. In the preface, the author writes "whether the period 1824-69 will be published depends upon the reception this part receives." Let us hope that his expectations will be fulfilled.

Ipswich Animal Welfare Centre.

We have received a copy of the second annual report of the above animal-treatment centre and are pleased to see that it has fully maintained the public confidence and esteem which it gained last year. Judging by the large number of cases which passed through its doors, the need for such an institution appears to be very real.

Reference to the balance sheet discloses that whilst the bank balance at the end of last year was £24, this sum has been increased to £41 notwithstanding the expenditure of £52 for veterinary surgeons' fees.

It is satisfying to know that poor people's animals which are taken to this clinic receive qualified veterinary attention if their maladies are of sufficiently serious a character to warrant it, and we would like to see more of these publicly supported animal-welfare centres conducted on similar lines.

Burns and Scalds.

The treatment of burns and scalds has received much prominence of late, and a report of 3,809 cases admitted to the London Hospital, published in the *Lancet* of November 1st, indicates that not only is there now a much lower percentage death rate, but that there has also been a marked and progressive fall in admissions. Treatment at the London Hospital for the majority of cases consisted in using a "burn ointment" containing several of the following ingredients:—Zinc oxide, boric acid, eucalyptus oil, soft paraffin, wool fat, and castor oil. Dr. Charles Donald, surgical First Assistant and Registrar at the London Hospital, the author of the report, is not an advocate of the tannic acid method of fixing the toxins, and in his experience this local application was no better than any other in combating toxæmia. He suggests that there should be a careful selection of cases for this treatment. Preference is given to intravenous injections of saline with the ingestion of alkalis and glucose.—*Pharmaceutical Journal.*

Colonial Veterinary Service Report.

Cyprus.

The Annual Report of the Veterinary Service for 1929 (Government Printing Office, Nicosia, Cyprus) is a foolscap publication of eleven pages.

Stock Census.

At the biennial census in 1928 the following totals were made :—

Horses.	Mules.	Donkeys.	Cattle.	Goats.	Sheep.	Pigs.
4,567	8,470	51,595	46,602	226,761	263,694	42,398

Staff.

The Chief Veterinary Officer is Mr. Robert J. Roe, M.R.C.V.S., D.V.S.M., who has the assistance of a graduate of the Cairo Veterinary School, four Stock Inspectors, and an Inspector of Dairies. Provision is made for the appointment of an additional Veterinary Officer with research experience. (Mr. Manley, B.V.Sc., M.R.C.V.S., has been transferred in this capacity from Nigeria.)

Research.

The usefulness of the Laboratory, which has received added equipment, is chiefly limited to diagnosis of materials submitted. A scheme for the preparation of anthrax vaccine is under consideration. The present cost of vaccinations is borne entirely by Government, and amounts to £4 10s. per 1,000 sheep.

A list of Nematodes, Cestodes, Dipterous larvæ, ticks and other parasites is published.

Stock Disease.

The insular position of the Colony, and the precautions taken with importations, have maintained a freedom from cattle plague, pleuro-pneumonia, foot-and-mouth disease, glanders, swine fever and dourine. Despite this, annual losses estimated at £70,000 worth of animal produce occur.

Anthrax is the most important enzootic condition, and accounts for serious losses in sheep and goats. Difficulty is experienced in making owners adhere to the Contagious Diseases Law, which is framed for their benefit, and attention is drawn to the inadequacy of punishments inflicted for breaches of the law. Annual vaccination of the flocks is proving of immense value, and its recognition by stock-owners is now assured. In 1922 only 800 vaccinations were carried out, while in 1929 they numbered 205,754, of which 1,500 only were in equines, cattle and pigs, the rest being in sheep and goats.

Blackquarter occurs even in old cattle, for which the filtrate is employed.

Stiff Sickness of cattle was seen in four areas, the disease being associated with feeding for long periods on rations containing a high proportion of legumes.

Tuberculosis did not come to notice during the year, and it is hoped that eradication is complete.

Contagious Abortion of cattle, which was imported in 1921, appears to be under complete control.

Pseudo-pox of goats, which occurs not infrequently in the winter months, requires investigation.

Parasitic Gastro-enteritis and *Bronchitis* in sheep and goats cause heavy mortality in underfed animals. Owners are being encouraged to use the simpler remedies.

Abortion in sheep occurred in three areas where a specific causal factor was suspected.

Piroplasmosis, *Tetanus*, and *Mastitis* in sheep and goats, are also encountered.

In *Poultry*, fowl cholera, fowl pox, coccidiosis and spirochætosis are met with. Over 5,000 doses of fowl cholera serum were used in controlling this disease.

Public Health.

The occurrence of anthrax has been noted above. An organised system of meat inspection is proposed.

The regulations in regard to milk appear most thorough, and an efficient control is exercised with real co-operation by the dairymen. There are 94 registered cowsheds and 106 registered dairymen.

It is necessary to limit the number of dogs, although no rabies exists. Poisoning is not allowed; the dogs are caught in nets, lassoos, etc., and destroyed in a lethal chamber. The carbon monoxide method is very efficient.

Genetics and Stock Improvement.

Small numbers of animals are imported by Government for stock purposes. No details of the results appear in this report.

Pastures and Foodstuffs.

Climatic conditions were favourable during the year. Very little hand feeding is engaged in by the many small owners. It is said that the mutton and lamb has a flavour less palatable than that of Syria.

Management.

Although scab has not been found, other ectoparasites demand routine attention, and five Government swim-baths have been built by Government and a number has been erected by private persons.

Trade and Industry.

The value of the livestock is estimated at £1,500,000, and the export of stock, milk products, wool and hides, in addition to animal products locally consumed is valued at £300,000 per annum. Animals to the value of £70,451 were exported. (From another source we learn that hides and skins worth £31,000, and wool, £28,000, were also exported.)

(Among the Imports are milk £7,000, butter and cheese £14,000.) There appears, therefore, ample scope for the improvement of the stock to meet this demand.

Large Black Pig Society.

Mr. John H. Glover, J.P., President, in moving the adoption of the report at the annual meeting of the Large Black Society, said it was a difficult matter to keep pace with the commercial demand for Large Blacks. They sold really well, and would continue to do so: That being so, it could not be said that the breed had other than a good future. Dealing with agricultural shows, he reminded the members of the publicity which these afforded, and urged that more members should exhibit pigs. He had not seen better Large Blacks than those exhibited at this year's shows, the young stock at the R.A.S.E. Show being particularly good, and containing some outstanding animals. They could have no better advertisement than those provided by the official report and the bacon pig competition at the last Highland Show, and by the results of the commercial pig competition staged by Mr. Frank Sainsbury at his recent sale. It was evident the breed was making good progress abroad and their outlook for export orders was very favourable. The pig industry needed sympathy and help while it was being organised.

The report was adopted, and Mr. Glover was unanimously re-elected President.—*North British Agriculturist.*

N.V.M.A. Divisional Report.

Midland Counties Division.*

The quarterly meeting of the Midland Counties Division, N.V.M.A., was held at the Raven Hotel, Shrewsbury, on Friday, November 28th. Mr. H. Tudor Hughes (Oswestry) was in the chair, and there were also present the following members:—W. F. Aston, James Martin, F. Chambers, J. G. Hoban, H. S. Caldwell, G. R. Benbow, R. Clunes, T. Thomson, A. E. Ferguson, A. B. Fewings, C. J. Clifford, T. Marriott, J. W. Conchie, W. H. Brooke, J. Robertson, A. Mackenzie, James Martin, W. F. Wilson, R. Hughes, J. E. Hutchinson, J. R. Carless, John Cane, T. D. M. Martin, G. V. Tyerman, H. W. Steele-Bodger, J. R. Barker, J. H. M. Hughes, H. Burrow, H. W. Dawes, A. B. Forsyth, and the Hon. Secretary (Mr. H. J. Dawes).

Visitors present included: Mr. Hugh Begg, Mr. H. H. Aldred, Dr. Gepp, Mr. Alfred Bate, Mr. J. W. Senior, Dr. Wilson Evans, Mr. R. Woof, Mr. W. H. Pruslow, Mr. H. C. Williams, Mr. G. Mayall, Mr. H. T. Matthews, Mr. A. L. Mullen, Dr. C. Crowther, and Mr. W. R. Kerr.

Apologies for absence were received from Sir John M'Fadyean, Sir Gilbert Barling, Dr. Graves, Professor Hobday, Messrs. E. Ringer, J. J. Burchnall, G. K. Miles, M. Sadler, R. L. Green, M. Tailby, F. L. Gooch, W. F. McConnell, B. L. Secker, G. H. Leader, C. Parsons, W. White, R. L. Phillips, H. S. Cockburn, Trevor Spencer, A. W. Findlay, G. Eaton, E. Hall, W. E. Ison, W. C. Blackwell, J. McLaughlan, G. F. Banham, J. A. Connell, A. W. N. Pillers, A. A. Forsyth, D. Forwell, T. H. Hobson, J. Whyte, S. M. Woodward, W. W. Grasby, J. C. Deville, O. V. Gunning, L. W. Heelis, C. G. Allen, B. De Vine, W. Trigger, Colonel Lowe, Messrs. J. Whyte, J. H. Wynne, etc.

Nominations and Elections.—The minutes of the previous meeting having been confirmed, nominations for membership were received. Mr. J. R. Carless nominated Mr. Parsonage, of Shrewsbury.

The Hon. Secretary nominated Mr. W. R. Kerr, of the Harper Adams Agricultural College, Newport (Salop), also Mr. J. Cane (Wrexham) and Mr. R. E. S. Tuckey (Whitchurch).

The following, who were duly nominated at the last meeting, were now unanimously elected members of the Division: Colonel W. C. Lowe (Eccleshall), Mr. A. B. Fewings (Ministry of Agriculture), Mr. E. A. Comer (City of Birmingham Veterinary Department), and Mr. W. S. Davidson (City of Birmingham Veterinary Department).

The Annual Meeting.—On the recommendation of the Council, it was agreed to hold the annual meeting and dinner at the Grand Hotel, Birmingham, in February next, as usual, the arrangements being left in the same hands as before.

Paper.—Mr. Hugh Begg, Chief Veterinary Officer of the Lanarkshire County Council, read a paper on "Some Phases of Veterinary Inspection under the Milk and Dairies Act and the Tuberculosis Order. Differential Diagnosis. The Application and Interpretation of the Double Intradermal Test."

[Mr. Begg's paper, together with the ensuing discussion and the essayist's reply, are reproduced at the commencement of this issue.—Ed.]

Vote of Thanks.—The President moved a hearty vote of thanks to Mr. Begg for his address, and this was seconded by Mr. Clunes, who observed that he and Mr. Begg were college friends over forty years ago.

Mr. Begg, in reply, said that he had been sufficiently repaid by the keen interest that had been taken in the discussion.

At the close of the meeting, the company were entertained to tea by Mr. J. R. Carless, of Shrewsbury, who was cordially thanked for his kind hospitality.

H. J. Dawes, *Hon. Secretary.*

* Received on December 10th, 1930.

The Royal Veterinary College.

At the Annual Dinner held in connection with the Haywards Heath Christmas Fat Stock Show, to which Mr. H. Taylor, F.R.C.V.S., is Hon. Veterinary Surgeon, Sir Merrik Burrell, Chairman of the Board of Governors of the Royal Veterinary College, Camden Town, in proposing the toast of the Show stressed the "dire need of funds to keep the College in existence." The country and the Empire were calling for veterinary surgeons, said Sir Merrik, and the call could not be met. The College at the moment had 200 students; last year 6,000 animals passed through their infirmary; 10,000 animals belonging to the poor of London through their free clinic; 20,000 operations had been performed; 4,000 X-rays taken; and 20,000 shoes had been fitted.

At the suggestion of Mr. Richard Hunt, of Haywards Heath, a collection was taken, which resulted in the handsome sum of £20 being raised in answer to Sir Merrik Burrell's appeal. Mr. W. Fry, Chairman of the National Farmers' Union, promised support.

The Local Farmers' Union are going to hold Whist Drives in aid of the Fund, while Mr. Bannister, the auctioneer, has also promised financial help.

. . . . . .

At a recent meeting of the Council of the National Pig Breeders' Association, the situation regarding the Royal Veterinary College was discussed, and the following resolution was carried unanimously: "That in view of the great importance of the live-stock industry to England, the absolute necessity of an adequately trained veterinary personnel if the industry is to pay, and the present impoverishment of the agricultural interest, representations be made to the Minister of Agriculture with a view to sufficient financial support for the Royal Veterinary College, Camden Town, being provided.

With regard to the Slaughter of Animals Bill, opinions were expressed that if the Bill became law a definite blow would be delivered at the British industries of pig breeding and bacon curing, largely because flesh from pigs killed with mechanically-operated instruments was rarely of the same standard of quality as that of pigs killed by existing methods. No resolution was put.

. . . . . .

The Unionist Parliamentary Agricultural Committee, at a recent meeting, again considered the prospect of the Royal Veterinary College being closed owing to inadequate support coming from the Government. Great anxiety was expressed at the consequences of this withdrawal of an essential source of agricultural education. The chairman (Sir Douglas Newton) was requested to communicate with the Minister of Agriculture on the subject and express the views of the Committee.

. . . . . .

Writing to the *Western Morning News*, Major G. Burgoyne, Master of the South Devon Hunt, calls attention to the appeal issued by the Principal of the Royal Veterinary College asking for assistance.

"May I make my appeal beyond the sporting world," the letter states. "The research necessary to the well-being of our cats and dogs, of our poultry yard, and of our byres, all springs from this old tumble-down college. There is no nation so innately humane to animals as we English. Can we really afford, will our own self-respect allow us, to see this institution sink and vanish?

"We are, par excellence, the horse-loving race of the world. For the last 400 years no squadron, regiment, or brigade of foreign cavalry has ever withstood a charge by our horsemen. Both in the battlefield and the hunting-field we have imposed our superiority as horsemen on the whole world—and don't let us forget it.

"Are we to show ourselves so pitifully mean, so miserably ungrateful to our help, our saviour, and our joy on many a field—or so thoughtless and unrecognizant of the blind devotion we get from our pets? We have had one 'cap' for the college in the South Devon Hunt. There are in Devonshire no less than twelve packs of foxhounds, to say nothing of innumerable packs of harriers.

"If members of the hunt, the next time their secretary takes a 'cap' for the R.V.C., come with—not 2s. 6d. or 5s., that's rather poor, isn't it? And you can afford more, you know—say a ten shilling or a pound note, why that £50,000 mark will be brought appreciably nearer."

Notes and News.

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events.

Jan. 5th.—N.V.M.A. Committee Meetings, at 2 Verulam Buildings, Gray's Inn, W.C.1: Organising, 2 p.m.; Appointments, 2.30 p.m.; Mining Sub-Committee, 3.15 p.m.; Parliamentary, 4.15 p.m.

Jan. 6th.—N.V.M.A. Committee Meetings, at 2 Verulam Buildings, Gray's Inn, W.C.1: Joint Meeting of Veterinary Officers and Public Health and Parliamentary, 10 a.m.; Veterinary Officers and Public Health, 10.30 a.m. **N.V.M.A. Council Meeting, at** 10 Red Lion Square, W.C.1, at 2.30 p.m.

Jan. 7th.—R.C.V.S. Committee Meetings. Council of Victoria Veterinary Benevolent Fund.

Jan. 8th.—R.C.V.S. Committee Meetings. Dramatic Entertainment, organised by Lieut.-Colonel P. J. Simpson, in aid of the Victoria Veterinary Benevolent Fund, at the Rudolf Steiner Hall, Park Road, London, N.W.1.

Jan. 9th.—**R.C.V.S., Council** and Committee Meetings.

Thursday Night is Theatre Night.

As a profession, our opportunities for collective enjoyment in the company of our ladies are all too few. On Thursday evening, in the performance by the Maidenhead Operatic and Dramatic Society, at the Rudolf Steiner Hall, 33 Park Road, London, of Ian Hay's delightful play "The Happy Ending," an outstanding chance is presented through the splendid efforts of Lieut.-Colonel P. J. Simpson and his Maidenhead friends, of linking pleasure with benevolence in support of one of the profession's own charities—the Victoria Veterinary Benevolent Fund.

We understand that rehearsals have revealed the attainment of a standard of achievement ensuring a first-rate performance; also that tickets have sold exceedingly well. We would therefore remind intending patrons that the last date upon which tickets can be secured from Lieut.-Colonel Simpson ("Shirley," Castle Hill, Maidenhead) is Tuesday next, January 6th, and also that it is expected that any members of the profession who find themselves unable to attend will send apologies for absence in the form of donations (however small) to the "Victoria" Fund, of which Colonel Simpson is Hon. Secretary.

Death of Captain Louis Sewell, M.R.C.V.S.

His many friends in the profession will be grieved to learn that Captain Louis Durden Douglas Sewell passed away at his home, 55 Elizabeth Street, Eaton Square, S.W.1, on Tuesday last, at the early age of 38 years. War service left Captain Sewell with impaired health, and he had suffered considerably from heart trouble in recent months, but the end came with unexpected suddenness, arrangements having been made for his removal to a nursing home. In his death the profession has lost a young member who had made a name for himself in canine practice, and who had written extensively and informatively on the diseases of dogs. Graduating from the London College in March, 1915, Captain Sewell worked with his father, Mr. A. J. Sewell, in practice, and, upon the latter's retirement, entered into partnership with Mr. F. W. Cousens.

Spahlinger Treatment of Cattle.

The Ministry of Agriculture of Northern Ireland has arranged to undertake an extensive experiment in the Spahlinger treatment of cattle against tuberculosis, which will extend over three years. The experiment will be under the personal charge of the Departmental bacteriologist, who is also a veterinary surgeon, and will cover the whole field of inquiry. It will be conducted in consultation with Mr. Spahlinger, and will be begun with as little delay as possible.

The United Hunts Ball.

Under the Distinguished Patronage of H.R.H. the Duke of York, K.G., P.C., K.T., The Dukes of Bedford, Richmond and Gordon, and Beaufort, the Marquis of Cambridge and the Marquis of Crewe, the Earls Rosebery, Fitzwilliam, Bathurst, Yarborough, and Iveagh, Lords Mildmay of Flete, Harlech, Glanely, and Daresbury, and the Chairman and Board of Governors of the Royal Veterinary College, the United Hunts are organising a Ball at the Savoy Hotel on Thursday, January 15th, 1931, at 9.30 p.m., the proceeds of which will be handed to the Royal Veterinary College for the Re-building and Endowment Fund.

Tickets £1 12s. 6d. (including Supper and Buffet) may be obtained from the Organising Secretaries, Miss Fenton, 4 Drayton Gardens, S.W.10, or Major A. Sowler, 33 Crawford Street, W.1. (Telephone: Kensington 6162). It is hoped that this will be well supported by members of the profession and their ladies, and that they will bring it to the notice of their friends.

Dillon Testimonial Fund.

The Dillon Testimonial Fund now stands at approximately £80, and we propose to publish a further list of subscribers in our next issue.

The organisers of the Fund gave Harry Dillon £5 from the Fund for Christmas. They thank all donors for the generous response and hope that there is still more to come, as it is proposed, if sufficient funds can be procured, to buy a small annuity for him.—"*Bis dat qui cito dat.*"

Veterinarian on Life in East Africa.

A very interesting and informative evening was spent by the London College Students' Veterinary Medical Society on November 25th, when Mr. J. Malcolm Armfield, M.R.C.V.S., lectured on general conditions of life in the wilder parts of Kenya, Tanganyika and Northern Rhodesia—the natives, the game, health, etc. The talk was vividly illustrated by a number of excellent slides, and photos under the epidiascope, while the many striking exhibits included specimens of native rope, milk jars, flutes, baskets and ornaments. The lecturer touched only lightly upon veterinary matters, stressing the importance to the student of gaining some knowledge of the conditions of life obtaining in remote parts of the world to which it might be his lot to go.

R.A.V.C. Children's Party.

"The Christmas Party given at the Royal Army Veterinary School, Thornhill, on Thursday, for children of the Corps in the Command, contained several features that were out of the ordinary," says the *Aldershot News*, of December 26th. "About 110 parents and children assembled to the music played by a portion of the R.A. Mounted Band, and then enjoyed an excellent tea. After this, the children pulled a gigantic cracker and there was much surprise when it was found to contain the Master of Revels, Major C. A. Murray, who conducted games and community singing to the delight of all.

"Next came the principal item, a pantomime entitled "A Cottage to Let" which, for the standard of its story, presentation and setting, would not have disgraced a professional production. There were many clever rhyming gags, and the story was that of a grumpy old couple, over whom a fairy casts a spell. Great delight was shown when Father Christmas arrived down a huge chimney and proceeded to cure Mr. Grouse's gout. The cast was as follows:—Mr. Grouse, Major A. A. Pryer, D.S.O.; Mrs. Grouse, S.-Sergt. Drew; Santa Claus, Colonel H. S. Mosley, D.S.O.; a Fairy, Joan Drew; a Rude Boy, Mr. Crisp. The committee are indebted to Mr. H. Carter, stage manager at the Aldershot Hippodrome, for the great help he gave in the preparation of the scenery.

"Toys were distributed by Mrs. Mosley, and finally a giant snowball was let down from the roof, containing still more toys."

The "Butter-Breeds."

"The landing in this country of one of the most valuable Guernsey bulls which the United States have produced is an unusual event which will evoke not only keen appreciation of the generous spirit of the American citizen responsible for the gift, but a renewed interest in the Channel Island breeds of cattle," says the Agricultural Correspondent of *The Times*. "Both Guernseys and Jerseys are held in high estimation in many countries in which dairy-farming is conducted on modern lines, where they are maintained in large numbers by working farmers as well as by those who are in a position to engage in showyard work and record-making. The fact that they have never attained much popularity among farmers in this country is due to three factors: the common, though largely erroneous, belief that they lack hardiness and disease-resistance; the practice of selling milk by bulk rather than by butter-fat-content; and the very general preference for dairy-cattle which can produce meat as well as milk. Without for a moment decrying the virtues of our native breeds, or denying the economic advantages of dual-purpose cattle under certain conditions, it must be recognised that the Channel Island breeds have certain merits which may yet bring about their more general distribution. The high butter-fat-content of their milk makes them singularly valuable for the production not only of butter but of milk which has a high sales-value in the better-class retail trade; and their purity of blood results in a remarkably close adherence to type."

The Editor acknowledges the receipt of the following:—

Report of a meeting of the North of England Division, N.V.M.A., from Captain J. R. Rider, Hon. Secretary.

Communication from Professor Z. Morcos (Guiza, Egypt).

Diseases of Animals Acts, 1894 to 1927.

SUMMARY OF RETURNS.

Period.	Anthrax.		Foot-and-Mouth Disease.		Glanders (including Farcy).§†		Parasitic Mange.§		Sheep Scab.	Swine Fever.	
	Outbreaks confirmed.	Animals attacked.	Outbreaks confirmed.	Animals slaughtered as diseased or exposed to infection.	Outbreaks confirmed.	Animals attacked.	Outbreaks reported by the Local Authorities.	Animals attacked.	Outbreaks confirmed.	Outbreaks confirmed.	Swine slaughtered.
	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.
Period 1 to 15 Dec., 1930	24	27	—	—	—	—	3	4	51	1	38
Corresponding period in—											
1929 ...	12	13	—	—	—	—	6	6	78	197	118
1928 ...	28	31	1	34	—	—	9	23	86	52	26
1927 ...	19	19	7	220	—	—	13	15	74	101	44
Total 1 Jan. to 15 Dec., 1930	362	407	8	305	—	—	189	282	436	2,331	1,026
Corresponding period in—											
1929 ...	417	507	36	3,448	—	—	195	377	589	2,841	1,661
1928 ...	517	597	134	11,143	1	1	260	539	625	1,432	723
1927 ...	409	480	80	6,074	—	—	330	528	682	1,723	803

Note.—The figures for the current year are approximate only.

† Including outbreaks in recently imported animals.

§ Excluding outbreaks in Army Horses.